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NEUROFIBROMATOSIS OF THE NERVES OF THE TONGUE (MACROGLOSSIA NEUROFIBROMATOSA) AND OF CERTAIN OTHER NERVES OF THE HEAD AND NECK.[1]

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ALTHOUGH neurofibromatosis, or plexiform fibroma of nerve, is a well-recognized disease, the examples which fall under individual observation are few. In certain situations it is, relatively speaking, not uncommon, but the part most strikingly involved in the present instance, viz., the tongue, is so rare as a site, and the disease so unique in degree, that we are led to report the case in detail.

Clinically, the condition of the tongue falls within the category of macroglossia, but it has nothing in common with the ordinary lymph- or hæm-angiomatous forms of the disease, and should it be included pathologically under the general name of macroglossia, it will need differentiation by some such term as that suggested in the title of this paper.

[1] Read before the Pathological Society of London, October 20, 1902.

CLINICAL DESCRIPTION BY MR. ABBOTT.

History.—D. Q., a female child, four years of age, was admitted into St. Thomas's Hospital in August, 1900. She was born in Somerset to healthy parents, and is the youngest of a family of seven, of whom three others are living, and quite normal, while the remaining three died in infancy.

The only family history of deformity or new growth is in the case of a first cousin of the father, from whom a tumor in the cheek had been removed by operation.

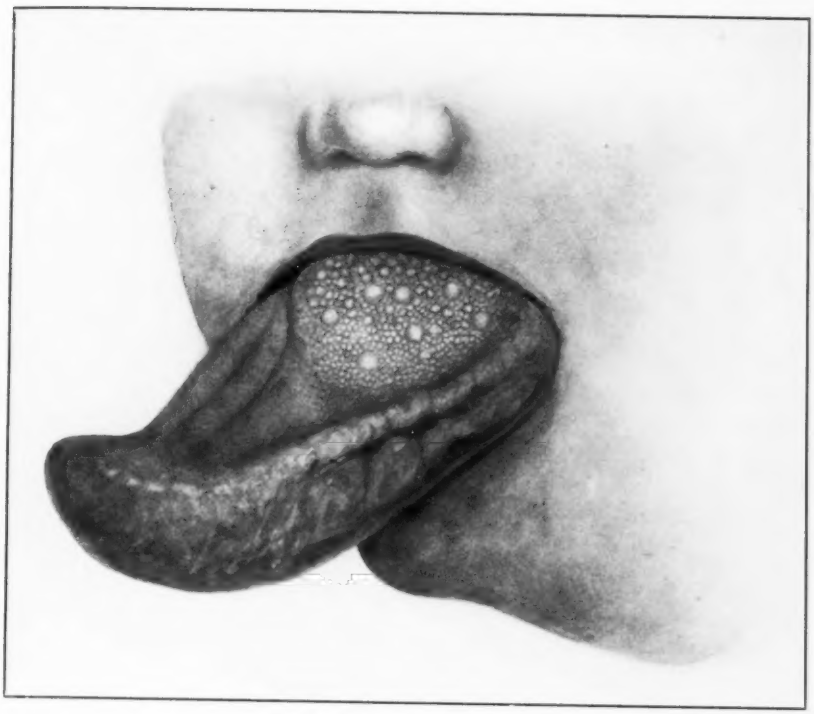
The enlargement of the tongue was first definitely noticed by the doctor who came to vaccinate her when she was two months old. But the mother has an impression that there was something wrong with the tongue when the child was born, and is positive that the peculiar formation of the ear was noticed at birth, while, when the baby cried, the ear and side of the face down to the mouth used to flush and become red, as to a certain extent they still do. The tongue steadily increased in size, and, when the child was one and a half years old, began to protrude from the mouth, which was more and more constantly kept open with the tongue exposed. From this time onward the increase has been constant, and with it the tongue, now nearly always protruded, has turned at its tip upward and to the right. It has sometimes been dry on its surface, but has never given much trouble on this account, the only sore complained of being one by the frænum, due to the weight of the organ resting on the lower incisor teeth. The teeth themselves have given no trouble and dentition has been regular.

The child began to talk at the usual age, but, even from the mother's account, has always talked indistinctly from the commencement, though speech has got worse *pari passu* with the enlargement of the tongue. Latterly, for some months before admission, the tongue has nearly always been kept out of the mouth, and, as a rule, the child sleeps with the mouth open and the tongue protruded.

The mother has thought but little of, indeed, has hardly noticed, the fulness of the left side of the face, and cannot say when the swelling in the neck began to be marked, but thinks it has "gradually increased with the rest."

The mother also thinks that, allowing for the general increase

PLATE I.



Surface appearance of the tongue in its natural position.

in size, the deformity of the ear is much as it was at birth, any change having been in the direction of gradual thickening.

State on Admission, August, 1900.—A bright and amusing country child, well developed both physically and mentally.

The *tongue* is greatly enlarged, and is kept throughout the day, and nearly always also when asleep at night, widely protruded from the mouth. It can, however, be withdrawn within the teeth and the mouth properly closed, and this the child will do whenever told to do so, but is not so happy in this state. This withdrawal of the tongue is managed by a peculiar rolling movement upward and to the right, the tip resting against the right side of the palate, and the main part of the enlargement lying behind and to the left. This movement she aids by throwing her head backward, as if swallowing a pill. On closer examination, the enlargement of the tongue is seen to belong entirely to the left side of the organ, and to be strictly limited by the median raphe. The enlargement of the left side is in all three dimensions. The right half is stretched out along the raphe, and therefore appears narrower and smaller than normal. Owing to the tension of this normal half, the raphe forms a bow curve, the concavity of which is to the right and ends on the right side of the organ some way behind the tip, the whole of the much enlarged and thickened tip being formed by the left side.

Owing, also, to this tension, the tip is curled sharply upward, so that just behind it there is a deep concavity on the dorsum, bounded by the thickened free edge of the left side of the tongue. Behind this concavity comes the prominence due to the local swelling to be afterwards mentioned, so that the upper surface, as a whole, is convexo-concavo-convex from before backward. The enlargement of the left side extends back as far, possibly even farther, than the circumvallate papillæ. The consistence is tough and firm, and when pinched it feels coarsely granular, while some cord-like structures can also be felt in it. Towards the posterior part is a fairly definitely circumscribed "tumor," shaped like a flat almond, with its long axis forward and outward. It is about an inch in length, and extends from the median raphe to the left border of the tongue. Posteriorly it reaches back to the circumvallate papillæ, and about two-thirds of it are protruded from the mouth in the natural position of the tongue. Though it presents a definite outline on the left border of the tongue, it is more

plainly circumscribed on the dorsal surface, and it is in the mucous membrane covering this that the changes in the fungiform papillæ are especially conspicuous.

The *mucous membrane* covering it is dry, thickened, and opaque, in places forming dull white patches. But the dryness is not so extreme as would be expected, and the general impression is one of coarsening.

The mucous membrane on the under surface is thickened and patchy, but on the whole smooth. There are, however, some deep folds along the free edge and extending downward from this.

The glands along the free edge are conspicuous, especially towards the tip. On the dorsum, the whole surface looks tough, granular, and coarse: this change being more marked posteriorly, especially over the local prominence due to the circumscribed tumor. This results from a very marked enlargement, both in diameter and height, of the fungiform papillæ, which form conspicuous objects. They are paler than natural, owing to the thickening of the corium over them. The impression clinically was that the conical papillæ were also enlarged, and they were certainly more distinct than usual.

The ranine vein was conspicuous on the under surface of the tongue. No vesicles, containing either clear fluid or blood, could be seen on any part of the surface.

The *face, palate*, and *fauces* were normal. There was a vague, diffuse fulness of the whole of the left side of the face, practically obliterating the lines, and diminishing the expression on this side. This was most marked on the cheek between the eye and the mouth, but could also be made out in a partial obliteration of the frontal furrows.

The mucous membrane of the lips showed a similar unilateral thickening to a slight degree.

The *neck*. This fulness extended over the ramus of the jaw, and became much more marked in the submaxillary triangle and upper part of the neck. Here it formed a conspicuous swelling extending from the mid-line back to the anterior border of the sternomastoid and downward to the level of the hyoid bone. Whereas on the face no structures could be differentiated in the swelling, in the neck it consisted of lumps and knotted cords of considerable size plainly to be felt through the skin. Nothing abnormal was noticed in the neck or side of body below this level.

FIG. 1.—Front view of child, with tongue as habitually protruded.

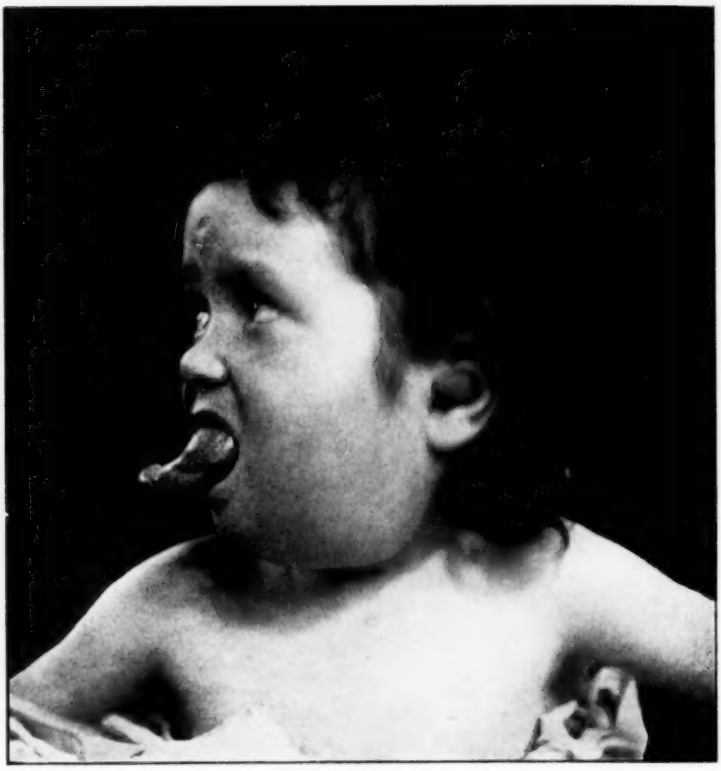


FIG. 2.—Side view of child, with tongue as habitually protruded.

The *ear* presented similar changes to those in the face in a marked degree. The left ear was obviously larger and thicker built than its fellow, and its long axis was increased by half an inch. This thickening involved the whole of the rim of the helix and the lower part of the antihelix and antitragus to a less extent. It was, however, most marked in the extension of the fore part of the helix across the cavity of the concha, which cavity was largely filled up by a smooth-covered mass shaped like the pulp of a finger. All these enlargements seemed due to thickening of the skin and not of the cartilage, and the skin on the posterior surface of pinna was also coarse.

The whole of these changes were strictly unilateral.

The child was mentally bright, and fond of chattering to any one who had her confidence, but seemed conscious of the badness of her speech before strangers. The words were thick and badly formed, but it was quite possible to understand what she said. There was a good deal of dribbling of saliva from the angles of the mouth, especially during sleep. She nearly always slept with the tongue protruded and snored a good deal. There was no difficulty in taking ordinary food. The hearing was not affected by the malformation of the auricle.

Whenever the child cried or got in a temper, a definite slight, but bright, unilateral flush suffused the whole affected side of the face. This the mother had noticed from early infancy. It was not accompanied by unilateral sweating.

Operation, September 5, 1900.—Under chloroform the tongue was divided by scissors along the raphe, but in one or two places, especially along the side of the definite growth, the incision entered the left side of the tongue.

The tongue was then freed from its attachments to the floor of the mouth and drawn forward, when a second division was made from the left free border, backward and inward, to join the posterior end of the first incision. This incision was planned so that the length of cut surface exposed should correspond to and fit the raw surface of the raphe. It was intended to pass entirely behind the growth, but a small portion of the posterior edge of the circumscribed growth was left behind, and from this the present recurrence has commenced. The circumvallate papillæ were not removed. The corium was thick and tough to cut. The tongue substance was firm and bled very little, and the cut surface

showed numerous convoluted and partially opaque white cords between and also apparently among the muscles. The cut surface left behind on the left side showed a similar structure.

The only vessel of any importance needing ligature was the ranine, and there was no extensive capillary oozing, as is usual in ordinary macroglossia. The two cut surfaces were now sutured together on the dorsal surface, and as far as possible below as well.

Owing to the rigidity of the remaining part of the left side of the tongue, the new raphe and tip were strongly curled over to the left side of the mouth.

After the operation the temperature continued quite normal. A few small surface sloughs formed, and had to separate on under side of tongue, but all was soundly healed when the stitches were removed on the ninth day.

For a few days there was some difficulty in feeding the child, but never any with her breathing.

Within a fortnight she could talk again, and her power of articulation was about the same as on admission, the words being indistinct, but understandable by any one who took the trouble.

On September 26 a second operation was undertaken, with the object of reducing the swelling beneath the jaw, which now formed by far the most conspicuous deformity. A large curved incision was made from the mid-line below the jaw, passing as low as the cornu of the hyoid bone, and then backward and upward to anterior border of sternomastoid in line with the horizontal ramus. This flap was dissected up, and a curious condition exposed. The swelling consisted of worm-like coils of semitransparent white cords, inextricably twisted, and with knots in places. These cords varied much in size, from extremely small and thread-like ones to others the size of a No. 3 catheter. This condition invaded all the anatomical structures of the part, even the platysma, and rendered their differentiation difficult. The two bellies of the digastric were made out and were also involved.

This tissue was cleared entirely from the submaxillary triangle, the removal including certainly the superficial part of the submaxillary salivary gland and lymphatic glands. Posteriorly the removal was carried rather high behind the ascending ramus, beneath the upper angle of the incision, and it was here doubtless that the damage to the facial nerve occurred.

FIG. 3.

The left ear. The right ear, normal.

There was again very little bleeding, and the wound was entirely closed with horsehair sutures.

On the second day after operation there was marked increase in the swelling of the left side of the face, which became almost tense. At the same time left facial paralysis was first noticed, apparently complete of the lower part of the face, but not above, as the left eye could be closed, and was always closed when the child was asleep.

The wound was dressed for the first time on the seventh day and the stitches removed. The temperature had throughout been normal. The wound was tapped with a director and a considerable quantity of clear serum escaped. This continued to escape in considerable quantity till the wound finally closed on October 12.

With a view to diminish the facial swelling, massage of the cheek was begun a few days after operation, and continued for a few minutes each day. But this swelling did not materially decrease before the child left the hospital on November 9, while the effects of the facial paralysis became more obvious.

Facial nerve. Dr. Turney, who kindly twice examined the child in the electrical department, made the following reports:

October 11. "Left facial nerve. No reaction to faradic current. To galvanic current no reaction either, but this was not carried far for fear of upsetting the child."

November 1. "No faradic irritability in either division of left facial. It must be remembered, however, that it is impossible to use strong currents. At all events, there is no sign of repair so far."

The child left the hospital on November 9 with a small battery to be used at home. She was very well in herself, the tongue lay entirely in the mouth and was nearly symmetrical, and articulation was quite as good as before operation. The appearance of the neck was greatly improved, but the facial paralysis with the fulness of the left side of the face still made an unsightly spectacle.

Through the kindness of Dr. Allden, of Bridport, we heard several times of the progress of the child, but did not see her again till readmitted for examination in the summer of this year. Her health in the meantime had been good; some power had returned in the face, the improvement being most marked in the last six months and her articulation had much improved. For

some time after her discharge the face had continued swollen and tense. This at first improved gradually, and the improvement had recently been more rapid. The tongue first pained her again in the summer of 1901, and the return of the lump in it was noticed then. The mother thinks that it varies in prominence, but on the whole gets larger. She used to snore badly at night, but never does so now.

Condition on May 6, 1902.—The child in herself is healthy.

The *tongue* now lies entirely in the mouth, which is naturally kept shut. It moves freely and is fairly symmetrical. There is a slight tie due to scar tissue beneath it, so that when told to protrude it, the dorsum rises in a convexity.

The raphe still passes over somewhat to the left to the new tip, but has largely resumed its median position. There is a recurrence of the tumor formation the size of a small almond. This has evidently arisen from the small portion of the circumscribed tumor left behind at the first operation. It therefore lies close to the raphe, and not quite an inch from the new tip. The mucous membrane over it presents the same characters, with the enlarged papillæ, as before. There is no trace of enlargement in the right side.

Several attempts were made to test the sense of taste, but, owing to the youth of the patient, failed. Tactile sense appears normal.

The palate and fauces remain normal. There is no atrophy or want of development of alveolus, and two permanent incisors are in position, while the jaws meet normally.

The *face*. The swelling of the face that occurred after the second (neck) operation has entirely disappeared, and the face is now much in the same state of slight general fulness as when the child was first seen. The flushes when she cries still take place unilaterally, but are less marked.

The *facial paralysis* has much improved. The left eye can be shut and even partially be screwed up, and is normally closed during sleep. There is also less asymmetry about the mouth.

The actual nerve condition was examined by Dr. Turney, who reports, "Left facial. Orbicularis oculi acts well. Orbicularis oris requires strong currents, but contraction is quite distinct. Considering the long history, however, I should consider any further improvement very doubtful, but it is quite possible."

FIG. 4.—Front view, two years after operation, showing amount of recovery of function of facial nerve.

FIG. 5.—Side view, two years after operation, showing present condition of ear, face, and neck.

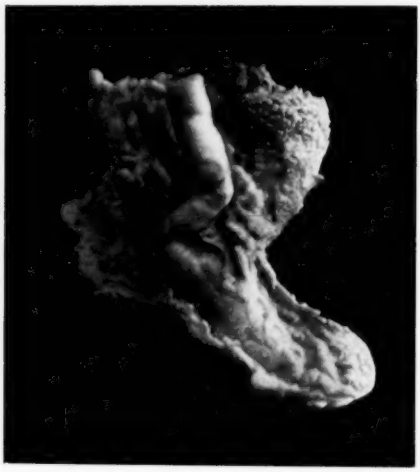


FIG. 6.—Dissection of part of tongue removed.

FIG. 7.—Neurofibromatosis of tongue, low power, showing the enlarged nerves among the bundle of muscle fibres.

The *ear* is much as when last seen, but the thickening has slightly increased, especially of the antitragus. No nerves can be felt on either surface of the auricle.

The *neck*. The scar is sound, and contracted below the jaw. There is no return of the knotted tortuous cords in the area of operation, but these can be easily felt around this area, and extend in various directions.

On careful examination, they can be detected in and as far as the following positions:

(1) Close to the mid-line of the neck in front of the sterno-mastoid muscle.

(2) Down to the second piece of the sternum.

(3) Over the whole area of the posterior triangle and crossing the clavicle.

(4) Beneath the skin over the mastoid process and above and behind the pinna.

In no instance do they cross the mid-line of the body, even in the tongue and submaxillary region.

PATHOLOGICAL ACCOUNT BY MR. SHATTOCK.

The specimen figured is the left half of the tongue, showing in a highly pronounced degree the condition of fibromatosis of the nerves or plexiform neurofibroma. Every nerve, as shown by dissection, is enlarged from the disease, even to those terminating in the divided mucosa along the lower side of the organ. The nerve most enlarged, the trunk of the lingual, measures .5 centimetre in diameter. All the nerves are markedly increased in length as well as in thickness so as to lie in serpentine or short transverse folds, with the result that in many situations a compact plexus has been produced. Towards the middle line of the organ such a plexus quite exceeds the distal portion of the enlarged trunk already referred to.

In the divided posterior surface the muscular substance is hardly recognizable in consequence of the universal enlargement of the nerves lying in it. The papillæ are increased in size so as to give the surface an abnormally coarse appearance; this is especially marked over the posterior part, in the situation of the chief swelling which is such as to render the general dorsum concave in place of convex; some of the fungiform series measure as much as three millimetres in horizontal diameter. The morbid

condition did not extend into the right half of the organ; and the same asymmetry was apparent in the neck, the right side of which was free of disease, whilst in the left there were extensive neurofibromatous swellings to be later detailed.

Histology.—Sections carried transversely through the base of the portion of the tongue removed show that the enlarged nerves constitute by far the chief part of the sectioned area, the bundles of muscle fibre being widely disparted between them. The enlargement of the tongue is due solely to the lesion of the nerves, the intervening muscular and connective tissues being compressed without trace of œdema or of lymph- or hæm-angiectasis. The nerves are enlarged throughout the section, even in the conical and fungiform papillæ, and present in places figures of abnormal complexity due to an unnatural tortuosity brought about by their elongation. The increase is the result of a diffuse formation of connective tissue of loose or open texture peripherally, but of closer centrally, where the enlarged nerve presents a denser core in which here and there a medullated nerve fibre is recognizable.

Each of the enlarged nerves is circumscribed by a lamellar sheath. The looser new-formed fibrous tissue is resolvable into ill-defined bundles of delicate wavy fibres, which subdivide to fill the intervening space with a widely open irregular mesh of finer fibres or single fibrils; and the tissue is provided with a considerable number of corpuscles of the ordinary connective kind. In cross section the bundles appear, naturally, as collections of polyhedral points like those of the endoneurium from which the new tissue has obviously arisen. Unna's acid orcein stain showed a complete absence of elastic fibre in the enlarged nerves. In certain of the enlargements nerve-cells are present,—*i.e.*, spheroidal cells of large size with deeply stained violet body (hæmatoxylin and eosin), a spherical nucleus of conspicuous size, and holding well pronounced nucleolus. Here and there such nerve-cells occur closely set in small groups within the enlarged nerve, each cell being provided with a multinuclear sheath: some such cells lie in the nerves of the mucosa, others, in those deeply placed. The occurrence of these cells may be taken as proving the involvement of the glossopharyngeal nerve (in addition to the lingual and hypoglossal), since microscopic ganglia normally exist upon the expansions of this nerve in the human subject. With the left half of the tongue there was removed, in two pieces, a mass from

FIG. 8.—Dissection of parts removed from the neck.

the left side of the neck. Each of these pieces admits on dissection of being resolved into a plexus of enlarged, elongated, and tortuous nerves. In connection with the larger, lower, of the two a considerable part of the superficial portion of the submaxillary gland was removed, together with a small extent of the platysma muscle.

The nerves over the platysma, like all the rest, are thickened and tortuous, those distributed to it ramifying like gnarled roots among its fibres. The submaxillary gland is intimately connected with the diseased nerves, many of which penetrate it, and render its lobules unnaturally firm in consistence. The upper of the two masses from the neck has precisely the same general characters, and it likewise comprises a small portion of the submaxillary gland, which as a whole appears abnormal in volume, a result to be ascribed to the enlargement of the nerves which pass through or supply it.

Microscopic examination of the gland reveals the fact that the pertaining nerves are as universally involved as those of the tongue.

REMARKS BY THE AUTHORS.

In the tongue the involvement of the nerves, though universal, is not uniform in degree, as appears from the eminence on the posterior part of the organ removed, which is such as to render the dorsum concave in place of convex. It is noteworthy that it is over this eminence that the papillæ are especially enlarged. The enlargement of the papillæ is in part due to the fibromatosis of the nerves within them, in part to an increase of the general connective tissue, but in no instance do they present lymphangiectatic or hæmangiectatic spaces as in the common forms of macroglossia. When compared with sections of the normal child's tongue, it is obvious that the corium of the mucous membrane in general is notably richer in connective-tissue cells and that its fibre has no longer the coarse fascicular normal character, but is more finely textured than natural, an overgrowth of a highly cellular new connective tissue having taken place precisely like that which is encountered in cases of neurofibromatous pachydermatocele.

If we turn to Robert Smith's work ("Pathology, Diagnosis, and Treatment of Neuroma," Dublin, 1849), we find the tongue to have been involved in the first of the two cases with which the

illustrations of the monograph deal. Besides the multiple fibromata on the nerves of the limbs and elsewhere, there existed on the under surface of the tongue nearly twenty tumors, varying in size from a hempseed to a walnut, and connected with the left hypoglossal.

Virchow, in his incomparable work (Lecture 24) refers to the example recorded by Colin in a cow (*Recueil de Méd. Vétér.*, Série IV, t. viii, p. 947); here there were tumors on various of the nerves, including those of the tongue.

These, however, are examples of multiple neurofibroma, rather than of the diffuse growth of connective tissue characterizing neurofibromatosis.

The case which seems to approach nearest to the present is one referred to by Alexis Thomson ("Neuroma and Neurofibromatosis," 1900), in which Bobrow observed in a boy, ten years of age, a plexiform tumor of the left side of the head and occiput, associated with left-sided macroglossia. Here it is not improbable that the macroglossia was of the kind described in the present communication, *i.e.*, neurofibromatous, although it was taken to be of the common lymphatic type as appears from its being discussed under the heading of the simultaneous occurrence of *other* defects of developmental origin with neurofibromatosis.

It seems to us best to place this case among the varieties of macroglossia, with the distinctive name of macroglossia neurofibromatosa, although in so doing we give weight to only one of the organs affected by the condition.

But this organ, the tongue, formed at first the prominent feature of the case, and was the sole trouble for which the child came under treatment. In ordinary macroglossia of lymph- or blood-vascular origin, moreover, it is not uncommon for the condition to extend beyond the limits of the tongue, for vesicles to be present on the mucous membrane of the mouth, and even for lymphatic cysts to be found in the submaxillary region and neck. As an example of diffuse neurofibromatosis of the nerves of the head, neck, and tongue, it is unique in its extent, and in the number of the nerves involved in this situation.

From the condition seen at the two operations, the examination of the parts removed, and the recent re-examination of the patient, we can enumerate the following nerves as having been implicated, viz.:

Among motor nerves, the hypoglossal, facial, and motor branch of the third division of the fifth nerve.

Among sensory nerves, the glossopharyngeal, the lingual and auriculotemporal branches of the third division of the fifth nerve, and the transverse cervical, suprasternal and supraclavicular descending branches of the cervical plexus.

Probably, also, the other two divisions of the fifth nerve and the small occipital and great auricular branches of the cervical plexus were involved as well.

Though we have no anatomical evidence in support of this view, the undoubted disturbance of function in the left cervical sympathetic, as shown by the unilateral flushings referred to above, hints at some possibly similar change in it.

From the clinical stand-point the case was a puzzle, and the true condition was not even suspected till after operation, and examination of the parts removed. The tongue itself closely resembled the organ in cases of the tough fibrous form of macroglossia of lymphatic origin.

Its special features were the strict limitation to one side of the organ and the more circumscribed "tumor" in addition to the diffuse new formation. Besides these were the marked enlargement of the fungiform papillæ, and the entire absence of vesicles or any signs of dilated lymph or blood spaces.

Almost the only clinical feature to excite suspicion in the tongue itself was its granular feel and the cord-like structures in its substance. The smooth solid thickening of the face and ear was explained as due to congenital blocking of the lymphatics of the neck, while the nodular and cord-like masses in this latter situation were thought to be maldevelopments of the same system. These formed the most unusual clinical features of the case, and should in a similar one lead to a correct diagnosis of the true pathological condition.

The clinical condition in the neck exactly resembled that described in other cases of neurofibromatosis.

In some cases also, covering the definite masses of neurofibroma, is a smooth thickening of the skin and subcutaneous tissue as was present in our case, in its true characters representing a diffuse molluscum fibrosum, and corresponding to the multiple soft fibromata of Recklinghausen's disease.

Was the general thickening of the side of the face and the enlargement of the ear of similar origin? We believe this to be the correct explanation, and it would best account for the inequalities of its distribution, and the almost localized "tumor" made by this condition across the concha of the ear. It is true that no changes in the nerve cords of this area could be felt, but neither can they be in Recklinghausen's disease.

Another possible explanation must be borne in mind, the possibility of the thickening being due to some trophic change, and connected with the unilateral flushings and vasomotor disturbance acting from infancy, and possibly from fœtal life. We do not see how to explain these flushings except as due to some involvement of the cervical sympathetic. This nerve may very probably have been involved with the others on this side of the neck, but the explanation needs the further large assumption that the diffuse neurofibroma causes interference with nerve function, of which there is no proof in the case of motor or sensory nerves, certainly none in the present case.

With this explanation in view, the child was examined for unilateral sweating, for changes in the pupil or in the vessels of the fundus, and for abnormal growth of hair as would be shown in the eyebrow, but in every instance with a negative result. Nor would this theory satisfy the almost local tumor formation in the ear, and we discard it for the other hypothesis.

The facial paralysis which resulted immediately from the second operation was no doubt due to the plexiform fibroma removed from the neck, having been largely of the facial nerve after it had broken up into its main divisions.

It must have been impossible from the incision made to

reach the normal course of the branches of the temporofacial. But so tortuous does the dissection prove the nerves to have become, that many of these branches may have bent down in their course and so have been divided. The extent of the paralysis that followed the operation is confirmation of the wide involvement of the facial nerve, even to its upper branches. The involvement of the cervicofacial was seen at the second operation, and can be demonstrated in the specimen of the parts removed from the neck.

REPORT OF SIXTY CASES OF ACTINOMYCOSIS.[1]

BY PROFESSOR R. VON BARACZ,

OF LEMBERG, AUSTRIA.

I HAVE chosen human actinomycosis as the subject of the present communication for two reasons: (1) Because this disease is of rarer occurrence in this country than abroad; (2) because I have made a special study of it, having had occasion during the last fourteen years to observe it in sixty cases; therefore, more than any clinic in Europe. The reason of its frequency in Galicia is the extensive farming in that country.

It is not my intention to speak broadly of its etiology, pathology, clinical course, and treatment. I shall only deal with some points which are doubtful and less clear, and which I shall strive to elucidate by my personal observation.

As to the seat of the disease, I have had fifty-two cases of actinomycosis of the jaw and neck, three of the tongue, three of the thorax and lungs, and two of the abdomen. As to the abdominal form, I have had occasion to observe three more cases in the practice of some of my colleagues, so that I observed altogether five abdominal cases.

Actinomycosis is produced solely by a special form of fungus, the streptothrix actinomycotica. This fungus usually enters the body through the mucous membrane of the mouth, of the air passages, or of the digestive tract. Very rarely it enters through the skin. The transmittents of the disease are exclusively minute vegetable bodies, as the awns of barley and grass particles. The proof of this is the frequent finding of these bodies in actinomycotic abscesses. The teeth are never the portal of entrance. The cases cited by Murphy, Partsch, and others, in which a communication between the abscesses of the soft parts and the alveolus was found, or in which a

[1] Read before the Chicago Surgical Society, December 1, 1902.

fungus was found in a decayed tooth, are not sufficient proof that the disease gained entrance through the decayed tooth. The evidence of the incorrectness of this route of entrance is the lack of decayed teeth in actinomycotic cattle, and sometimes in human subjects; the impossibility of finding the fungus in decayed teeth, and the frequent finding of the fungus in the soft parts of the cheeks. I have myself detected such vegetable bodies in thirteen cases of cheek and tongue actinomycosis, but never in decayed teeth; in these I only found the leptothrix buccalis.

Decayed teeth play an important rôle in the etiology of the disease, as the softened and swollen gums allow of an easy entrance of the fungus with a foreign body. The fungus rarely develops in the mucous membrane of the mouth itself. It wanders towards the surface of the body, and develops either in the region of the angle of the lower jaw or lower in the neck. If we carefully observe cases of neck actinomycosis, we will be convinced of its buccal origin. Allow me to cite a case.

A young man had eaten some apples on Christmas-eve—apples which were packed in straw. He felt that something had pricked his gum behind the wisdom tooth. A few days later he was unable to open his mouth as well as before, and later on a nodule developed below the angle of the jaw, and the jaw stiffness subsided. Some weeks later I saw him with an actinomycotic lump in the lower part of his neck, which softened and gave rise to long-continued ulceration. I found a particle of straw in the abscess cavity, which in all probability had entered his gum while eating the apple.

Bones are never primarily attacked in actinomycosis of the jaws, either in man or animal. The central bone forms of Poncet do not exist. Tumor-like forms do occur in the lower jaw and neck, but rarely. I have observed two cases; in one the diagnosis was made after the enucleation of the tumor.

Treatment.—My method of treatment in the first forty cases was operative. It consisted of curettement and extraction of teeth. As the disease generally produces a hard wall around the softened area, and this wall hinders the extension of the

process, I attempted in several cases to produce such a wall, which consists of connective tissue, by hypodermic injections of irritants like tincture of iodine, and 20 per cent. solution of silver nitrate. In this manner I was able to cure my last nine cases without any operative interference. Nitrate of silver in sticks, or in 20 per cent. solution, not only produces such boundary of connective tissue, but kills the fungus.

Tongue actinomycosis occurs in the form of circumscribed or diffuse abscesses. In three cases of tongue actinomycosis I found vegetable bodies in softened tissues. They were cured by opening and curettement.

In actinomycosis of the thorax and lungs the prognosis is very unfavorable. Three of my cases have died. The fungus enters here by the air passages or the œsophagus. In one case I found at the necropsy a fistula between the œsophagus and the posterior mediastinum. These cases are not suitable for surgical treatment, because we cannot reach the deep foci in the lungs and in the prevertebral region. The few reported cases of lung actinomycosis must be considered with great reserve because of the short time for observation after the operation. In my opinion, the only way of dealing with these cases is by so-called blood antisepsis, the method first introduced by Girido Bacelli for the cure of syphilis, and later advised by Credé in cases of septic pyæmia, namely, the intravenous injection of colloid silver (collargol). We already know of the great value of nitrate of silver in actinomycosis. Knowing, however, that nitrate of silver coagulates blood, we must choose some substitute for it. In order to convince myself if the animal organisms can tolerate such blood antisepsis, I have attempted intravenous injections of the various soluble preparations of silver in a number of dogs and rabbits. For this purpose I used one to two per cent. solutions of argonin, argentamin, largin, ichthangan, and soluble colloid silver (collargol) in increasing doses, and the last proved the best, even in comparatively large doses, according to the body weight of the animals. I observed no unpleasant symptoms.

I will endeavor to speak of my method of procedure at

another time. I believe that intravenous injections of collargol in actinomycosis of the lung and thorax will be of great service.

In abdominal actinomycosis the fungus also enters the system through the mucous membrane of the alimentary tract with vegetable bodies, which usually lodge in the region of the cæcum or vermiform appendix. Several cases are reported in literature in which vegetable bodies were found in perityphlitic abscesses. In a case related by Boström the awn of barley was found in an ovarian abscess, but this ovary adhered to the vermiform appendix. In these cases of abdominal actinomycosis the prognosis is good only if the disease is limited; if, however, the prevertebral tissue, the liver, or the portal vein become involved, the prognosis is very bad, because then we can easily have metastases; and if mixed infection supervenes, a septic pyæmia results. Two of my abdominal cases were cured, one of these (perityphlitic actinomycosis) by the introduction of nitrate of silver sticks into the focus.

As far as the fungus itself is concerned, I came to the conclusion through personal observation that there is only one form of the fungus which produces actinomycosis. This view of mine is contrary to the assertion of Beresteff, who claims to have discovered many forms of the fungus. Some authors require cultures for a positive diagnosis of actinomycosis, but I believe this to be unnecessary, often impossible, and thus many cases would be unrecognized. The fungus can be very easily discovered microscopically, and it is often possible to diagnose the disease macroscopically with some degree of certainty.

The characteristic appearance of the fungus macroscopically is that of minute grains, the size of a poppy-seed, or smaller, of a lemon-yellow color, hard, so they can be crushed only by some pressure of the cover-glass upon the slide. Microscopically, the fungus consists of the following parts: (1) The clubs; (2) the mycelium threads, and (3) large quantities of small bodies like micrococci. The clubs may be absent, but never the mycelium threads or the small bodies. The mycelium threads are very thin, are dichotomically branched, and have

some small clubs on their extremities. They consist of a sheath and very minute bodies, similar to those in the meshes. These bodies are the spores, as proved by Boström. The threads are best stained by Gram's method. The clubs may be stained only in sections by fuchsin or eosin. Hæmatoxylin is a good counter-stain. The mycelium threads, with the small bodies in the meshes, are sufficient for diagnosis. The single fungi form colonies. Grains without clubs form the youngest stages of development. Where the clubs are present, fungus is mature. This may be proved by studying the fungus in the different stages of the disease. There are some anomalous forms of the fungus in which, besides the normal threads, there are some very thick threads, which probably are degenerative changes of the sheath of the threads.

The cultures of these grains do not always succeed. In some cases I succeeded in obtaining cultures in all known ordinary media, and raw eggs, but only with the exclusion of oxygen (anaërobe).

As to animal inoculation, I tried it in mice, pigeons, hens, dogs, and rabbits. In mice, pigeons, and hens the fresh grains were introduced under the skin, but they disappeared entirely after some weeks. In dogs the grains were inoculated into the peritoneum, and they also disappeared. Only in a few rabbits the inoculation resulted in tumor-formation after six weeks. The tumors were examined microscopically, and proved to be only irritative changes, as produced by other foreign bodies. We see in the specimens the formation of epithelioid cells surrounded by lymphoids, a view shown in encapsulation of foreign bodies.

I must thoroughly agree with Boström that animal inoculation is not successful in actinomycosis.

EXTRADURAL HÆMORRHAGE FROM RUPTURE OF THE MIDDLE MENINGEAL ARTERY.[1]

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My object in this contribution is to report two cases of rupture of the middle meningeal artery and compression of the brain by an extradural clot, with operation and recovery, and a third case in which the symptoms closely simulated those of extradural hæmorrhage, but in which operation showed it to be absent. These cases all came under my observation in a short space of time, and, as I had previously encountered but two similar cases in my own experience, I thought they might be of sufficient interest to make this report.

Case I.—*Fracture of Skull; Extradural Hæmorrhage from Rupture of Middle Meningeal Artery; Fracture of Tibia and Fibula; Lacerated Wounds of Face, Mouth, and Scalp.*

W. C., white, aged nine years, was admitted to the Children's Hospital, April 22, 1902, with a history of having a short time before fallen from a freight-car on which he was playing. When admitted he was conscious, but somewhat irrational, and was still suffering from shock. His temperature was 98° F.; pulse, 92, but of rather poor volume. He was bleeding freely from a wound in the chin about two inches long, which communicated with the mouth. The upper lip was torn from the gum and superior maxilla, almost opening the nasal cavity, and the left cheek was cut internally by impaction against the teeth, two of which were broken. There was a slight lacerated wound of the scalp in the posterior parietal region on the right side, not extending to the bone, and around and above it a considerable hæmatoma. Palpation in this region gave a distinct sense of depression in the underlying bone. The left tibia and fibula were fractured transversely

[1] Read before the Philadelphia Academy of Surgery, November 3, 1902.

in their lower third, and the lower fragments and foot were drawn backward at a considerable angle by the action of the calf muscles. There was no paralysis of face or limbs; the pupils were equally contracted. He vomited freely after admission. The boy was etherized, and the fracture of the leg reduced, the tendo Achillis being divided subcutaneously to facilitate reduction and prevent subsequent deformity; and the foot, leg, and knee fixed with double lateral splints of binder's-board and placed in a fracture-box. The wounds in the face and mouth were sutured. A diagnosis of probable fracture of the skull was made, but, as the depression seemed moderate and the symptoms rather those of concussion with shock than compression, surgical interference was postponed. The patient reacted well from the shock, pulse dropping from 120 on the evening of the 22d to 76 the following evening, but the temperature remained slightly elevated, ranging from 100° to 101$^{3}/_{5}$° F., and his mental condition being dull during the day and somewhat delirious at night. He was roused with difficulty. The pupils were equal and contracted; there was no paralysis. He vomited a couple of times on the 25th and 26th. The hæmatoma over the right parietal region continued to increase in size. While there were distinct evidences of cerebral irritation, it was difficult to separate them from those naturally due to the shock and concussion, complicated as they were by his other injuries.

On the evening of the 26th, however, after a bad night and day, his pulse suddenly dropped to 48, and operation was at once decided upon. Dr. Wharton, who had seen him several times with me, assisted me. Incision evacuated the contents of a large hæmatoma in the parietal region, and revealed a moderate depression above and behind the right ear about three-fourths of an inch in diameter; and running from this, parallel to the median line, was a fissure several inches in length crossing the parietal and penetrating the frontal bone. An extradural clot presented itself after removal of a fragment of the depressed area, which it filled, and from which it extended forward. It was gradually uncovered by cutting away the bone on either side of the fissure with rongeur forceps, until its anterior limit was reached about four inches in front, where the middle meningeal artery had been torn. The clot was about three-fourths of an inch thick and about two and one-half inches wide. After removal, there was free

hæmorrhage from the region of the vessel, which was only checked by packing with gauze strips, as the bleeding vessel could not be isolated. The brain was much depressed by the very large clot, but the dura was uninjured. The packing was brought out at the anterior portion of the wound, a gauze strip laid in the posterior angle, and the remainder of the wound sutured. The patient was slightly shocked, but soon rallied. The next day his pulse varied from 92 to 100, and temperature fell from 101⅖ to 100⅗° F. His mental condition at once began to improve. The restlessness and delirium abated, and while he was very dull and slept a great deal for several days, he was easily roused, and at the end of this time regained fully the possession of his mental faculties. No paralysis was present at any time before or after the operation. On May 1 he was again etherized and the packing removed. There had been considerable oozing after operation, and there was some fresh bleeding from the region of the vessel, which was controlled by a little packing, which was removed three days later. The greater part of the wound healed by first intention. The temperature remained slightly elevated for a week, between 100° and 100½° F.; but his condition gave us no anxiety after the operation, and his convalescence was uneventful. Medication consisted in calomel one-tenth grain every three hours, with bromides for restlessness, and strychnine after operation.

CASE II.—*Contusion of Head; Rupture of Middle Meningeal Artery; Extradural Hæmorrhage; No Fracture of Skull.*

D. C., aged thirty-three years, Italian, was admitted to the Presbyterian Hospital, July 1, 1902, at 5.30 P.M. He had been struck on the left side of the head by a piece of cable, from the breaking of a derrick that morning, knocked down and stunned. He either did not lose or soon regained consciousness, and refused to go to the hospital, but did not resume work, walking with assistance to a shanty near where he was employed. In the afternoon, several hours later, he became unconscious, and was hurried in the patrol to the hospital. He was admitted in an unconscious condition. There was a contusion, with an underlying hæmatoma and two slight superficial lacerations of the scalp about four fingers'-breadth behind the left eye and a similar distance above the zygoma. The temperature was 96° F., pulse 48, respiration 24 and irregular. The pupils reacted to light. There was a slight protrusion of the left eyeball and œdema of the lid on same side.

The face was not noticeably drawn. During examination he resisted with the left arm only, although he was able to make indefinite movements with the right arm and to move both legs. There was a very distinct partial paresis of the right side. He made no attempt to speak and seemed to recognize no one. I saw him at 8 P.M. Coma was now more profound. The pupils were fixed midway between contraction and dilatation, the left slightly larger than the right; neither reacted at all to light. Temperature $98^{2}/_{5}^{\circ}$ F., pulse 68, respiration 20. No movements of extremities at all. Condition otherwise as given above. There was a sense of depression in the left parietal region, which led me to think we would find a fracture. The patient was at once prepared for operation and ether was found necessary. During preparation he moved the right arm and leg a little, showing paralysis was not complete. A semicircular flap was reflected over the contused area on the left side and the bone exposed, covered by a hæmatoma of external origin. No fracture was discovered. I had been led by his history and symptoms to suspect a rupture of the middle meningeal artery, and when I found no fracture, determined to trephine over its location and examine it. The incision was enlarged anteriorly, and the crown of a medium-sized trephine applied, with the pin over a point two fingers'-breadth behind the external angular process of the frontal bone, and three fingers'-breadth above the zygoma. The button removed was grooved by the vessel, which was bleeding in its immediate neighborhood, and a dark clot filled the opening.

The trephine opening was then enlarged in a backward and downward direction, the artery spurting in the wound, following the direction of the clot. An unsuccessful attempt to tie the artery was followed by easily checking the hæmorrhage by packing a couple of small strips of iodoform gauze between it and the edge of the bone. The clot was then followed backward, and an opening in the bone three inches by one and three-fourths inches in its widest diameters was necessary to remove the clot, which extended at least three-fourths of an inch beyond the edges of this opening, was about three-fourths of an inch thick, and was removed with some difficulty by a sharp spoon. After its thorough evacuation, the much depressed dura was found apparently uninjured; a gauze drain was laid in the opening and brought out at the posterior angle. The two small pieces of gauze controlling the vessel

were brought out at the anterior extremity and the wound sutured. Immediately after operation, and before he was removed from the table, the patient moved the right arm and leg freely; both pupils reacted to light, and the character of the respirations was much improved. Temperature, 99⅖° F.; pulse, 92; respiration, 20.

Consciousness was rapidly restored, and the following morning, July 2, his mind was clear and he talked freely. Temperature, 97° F.; pulse, 72; respiration, 15. No paralysis noted. His improvement after this was rapid. The temperature was slightly subnormal, varying from 96⅕° to 98⅘° F. for seven days, when it became and remained normal. On the fourth of July it was noted that the right side of the face was a little flaccid during whistling or smiling. The wound was dressed on the fourth day, found clean, and the packing removed. There was a little oozing from the anterior angle. The mental condition was normal from the morning after operation. The slight facial paralysis had disappeared by July 8. The patient was with difficulty persuaded to remain in bed for two weeks, and was discharged July 22 with a very small granulating area at the anterior angle of the wound; the rest healed solidly, although with moderate depression present.

CASE III.—*Contusion of Head; Concussion of Brain; Cortical Irritation, probably due to Minute Hæmorrhage or Laceration.*

H. W., white, aged nine years, was admitted to the Children's Hospital on the evening of April 19, 1902. He had been struck a short time before by a trolley-car; was unconscious when picked up, and remained so for five minutes. He was in a semistuporous condition when admitted, and very irritable on examination. He presented a contusion, with much swelling over the left supraorbital region. The pupils were dilated, pulse small, and skin clammy. No paralysis. He vomited twice while still in the receiving ward. I saw him at this time and made a diagnosis of concussion. Soon after this, and when sent to the ward, he became totally unconscious, and about one-half hour later developed muscular twitching, confined to the right side of the face, lasting for a couple of minutes, and at the same time vomited freely. About ten minutes later he had a convulsion, preceded by twitching of the right side of the face, and then involving the right arm and leg and lasting for about fifteen minutes, the left arm and leg being affected during the latter part of the time also. The child

remained unconscious, and a third convulsion occurred while he was being prepared for operation, beginning on the right side and becoming general, although the movements were more marked on the right side throughout. There was external strabismus in the left eye; pupils equal and contracted. Breathing stertorous; pulse, 104; temperature, normal. Dr. Wharton saw him with me four hours after admission, and we decided, in view of the urgent and very alarming symptoms, to operate. Examination of the shaven scalp showed only the contusion in the left supra-orbital region. A flap was reflected at this point, and no fracture found. The right side of the face was now paralyzed, but the child seemed to be regaining consciousness. I trephined over the region of the middle meningeal artery on the left side, using the measurement already mentioned, but allowing for the age of the patient. The artery was at once exposed unruptured and with no clot to be observed. The opening was enlarged in a posterior direction over the motor area with the rongeur forceps, and the dura found apparently uninjured, with no evidences of fracture or subdural clot. During this time the right arm and leg continued to twitch. Bearing in mind those rare cases in which the symptoms of cortical irritation are on the same side as the lesion, a small semicircular incision was made on the right side, and a small trephine used to uncover the right middle meningeal artery. This was also found uninjured where exposed under the button, and the latter was at once replaced and the wound sutured. The first wound was sutured, a small gauze drain being inserted. As we had failed to find the cause of the alarming symptoms, the probable diagnosis was either a laceration of the brain, or minute hæmorrhage into the cortex. Following operation the symptoms rapidly ameliorated. The temperature rose to 102° F., falling by the next morning to 100½; pulse, 104; respiration, 24. There had been no more convulsions, and his mental condition had improved rapidly and was quite clear. The facial paralysis had disappeared, pupils were equal, strabismus gone. On the 21st his temperature fell to normal, and did not rise above 100 afterwards, and the improvement in his general condition continued. He slept a good deal for the first two or three days, but exhibited no other special symptom. The wounds healed by primary union. He remained in the ward for several weeks, during which time he exhibited no ill effects from his injury, when he was discharged apparently cured. His medication consisted of calomel and bromides for the first three

days and then bromide alone for several days longer, with small doses of digitalis for two days after operation.

In the first case reported the line of fracture crossed the anterior branch of the artery and explained its laceration. In the second case, where there was no fracture, the contusion was sufficient to rupture the vessel, a possibility well recognized. Tillaux showed that the adhesions between the dura mater and skull were weak in the temporal fossa, and this in fact constitutes the "zone decollable" of Marchant, and would favor rupture. The presence of perforating branches from the vessel which pierce the skull and are liable to be pulled upon when the elastic skull springs back after momentary depression by a force perhaps insufficient to fracture it (Steiner[1]) also exposes the vessel and its branches to dangerous traction.

As regards the symptomatology of these cases, in the first case the classical clinical picture of extradural hæmorrhage was absent, the symptoms being more those of fracture of the skull with concussion or injury of the brain. The leakage of blood through the fissure into the subaponeurotic space probably relieved the pressure on the brain for a time and accounted for the preservation of consciousness and absence of paralysis. Gubler,[2] in a study of a large series of cases of fracture of the vault of the skull from Krönlein's clinic, reports a case in a boy four years of age in which there was apparently a rupture of the middle meningeal artery, a fracture of the skull, and a hæmatoma under the scalp communicating with the interior of the skull. The case recovered without operation. He quoted four analogous cases from Wiesman, two of them in children (observed by Holmes and Golding Bird), and explains the cause of this phenomenon in early life by the intimate adherence of the dura mater to the skull at this time. The temperature, slightly subnormal at first, then moderately elevated, was more suggestive of hæmorrhage, this being a common feature according to Phelps.[3] The slow pulse is not always observed with epidural clot, but in this case the sudden drop to 48 before operation was significant of cerebral compression.

In the second case, that of the man, the clinical picture was most complete. The initial stunning, the interval of con-

sciousness followed by rapidly deepening coma, with subnormal temperature, slow pulse, stertorous breathing, and contralateral hemiplegia, and with dilatation of the pupil on the affected side, made up a symptom-complex which scarcely admitted of other interpretation.

In the third case the diagnosis of hæmorrhage, while less certain, was, I think, justifiable, and trephining strongly indicated. There was a history of loss of consciousness, followed by its partial restoration, and then in a short time a deepening coma with severe convulsions starting on the opposite side from the injury, and followed by paralysis of the face on that side. The exact nature of the lesion remains unknown, but it seems probable that there was a slight hæmorrhage or laceration in the motor area. In two of Phelps's cases of cerebral contusion there were general convulsions, and in both he found large pial hæmorrhages, with in one case intense congestion of the dura and in the other a limited contusion of the temporal area. Muscular twitching and general convulsions were observed by him after both hæmorrhage and contusion, but he regards such motor disturbances as more characteristic of contusion, as paralysis is of hæmorrhage. Cortical irritation causing convulsive movements was, however, pronounced, and contributed to correct diagnosis in a case reported by W. J. Taylor.[4] The second trephining on the other side was indicated by the apparently desperate condition of the boy and by the possibility of that rare condition, as yet unexplained, of collateral palsy to which all authors allude, although some regard it as apocryphal. The rapid amelioration of symptoms after operation may have been due in part to relief of intracranial tension by trephining. The measurement which I used for locating the trephine openings and exposing the anterior branch of the artery in the second and third cases, two fingers'-breadth behind the external angular process of the frontal bone and three fingers'-breadth above the zygoma, is one which I have frequently tested on the cadaver, and corresponds in my own hand very closely to the measurement formerly recommended by Treves,[5] viz., one and one-half inches behind the external angular process of the frontal bone and one and three-quarters inches above the

zygoma. It makes the point of exposure a little higher than Krönlein's,[6] which is the one favored by Plummer[7] after an exhaustive series of tests, and the one Treves[8] now furnishes, and which is located on a line drawn through the supra-orbital ridge parallel to Reid's base line at a point from three to four centimetres behind the external angular process. Plummer found all the measurements recommended for exposing the posterior branch to be unreliable, but Steiner's as open to the least objections. This locates it at a point where a line drawn horizontally through the glabella is intersected by a vertical line running just in front of the mastoid process.

Steiner[1] and Plummer[7] both suggested the applicability of an osteoplastic flap exposure of the vessel which would render unnecessary these exact measurements, avoid the necessity of more than one opening, and the necessary leaving of large gaps in the skull, such as are indispensable to a thorough removal of a large clot and perfect control of hæmorrhage. This method has been used several times for this purpose, as Plummer[9] describes in his second article on this subject, where he reports two cases operated upon by the Hartley-Krause method in his own hands, with exposure of the clot, and recovery in one case, death in the second case being due to complicating injury of the brain. That the method is of value seems certain; but it seems to me that in cases of great doubt as to the existence of a hæmorrhage or fracture we should not always forego preliminary exploration by incision of the soft parts or even the application of a small trephine over the anterior branch of the artery.

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NEW INSTRUMENTS FOR THE TREATMENT OF ŒSOPHAGEAL STRICTURE.[1]

BY THEODORE DUNHAM, M.D.,

OF NEW YORK.

I HAVE been led to devise new instruments for the treatment of cicatricial stricture of the œsophagus because those in common use are unsafe and often inefficient. The danger of exerting any considerable force in the passage of a bougie down the œsophagus needs no emphasis from me. The frequent disasters are well known. The chief danger arises from the fact that the bougie is not securely held to its course down the œsophagus. I think I have eliminated this danger by devising a guide and a bougie which must follow it.

The guide, or guide-bougie (A, Fig. 1), as I may call it, consists of an urethral bougie which terminates at one end in a piece of wire some three feet long. In order that the bougie may be securely attached to the wire, the wire is made to run through the axis of the bougie and is fastened to a metal tip at each end of the bougie. I have found a wire of German silver to be excellent for this purpose, because it allows one to give the bougie various bends to meet the exigencies of distorted strictures. The ordinary œsophageal bougie is hollow. To adapt it to my purpose, I have had both ends cut off, and for its tip have substituted a metal one through which the lumen of the bougie is continued (B, Fig. 1).

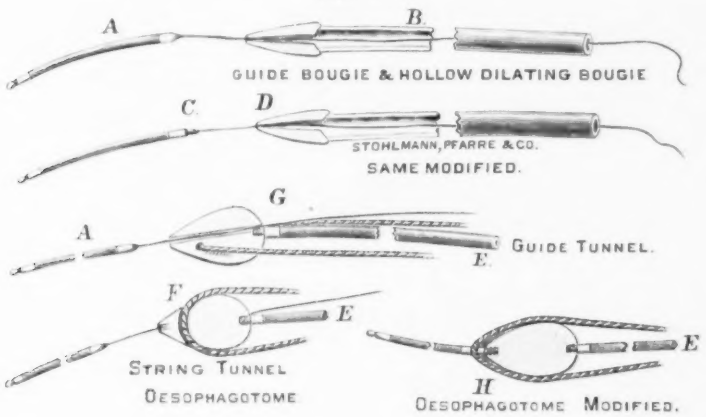
This form of bougie I use in the following way: A guide-bougie is chosen of such caliber that it will find its way to the stomach with so little resistance as to give perfect confidence that it has not punctured any weak portion of the œsophageal wall. The guide-bougie occupying the œsophagus, the hollow bougie is now threaded upon its wire and slid down the whole length of the wire. The bougie may now be pushed down the

[1] Read before the New York Surgical Society, March 12, 1902.

œsophagus, the guide holding it securely to its course. The guide, meanwhile, gets out of the way by curling up in the stomach.

It is essential that the wire be securely attached to the bougie portion, and it is to accomplish this that I have had the wire run through the axis of the bougie and rigidly attached to a metal tip at each end. In using the bougie some tension should be made upon the wire in order to keep the two parts of the instrument snugly together. I have also found it well

FIG. 1.



to have the patient's shoulders thrown forward and the head thrown back to straighten the path of the instrument, as this tends to prevent any kinking of the wire where the bougies join. There is some danger of this unless care is used. I have modified this form of bougie and guide with the idea of eliminating the danger of this kinking. Though I have not yet used the modification, I believe it is an improvement, and hence venture to report it.

In this modification the cap of the guide-bougie from which the wire projects ends in a portion of reduced caliber (C, Fig. 1), and this portion slides loosely into the lumen in the tip of the dilating bougie, this lumen being made somewhat larger than formerly to receive it (D, Fig. 1). The result of this arrangement is that the bougies in coming together lock in

such a way that there can be no kinking, and they form one firmly continuous instrument.

The curling of the guide in the stomach requires a little force, and when the bougie enters the stomach there may not be any marked lessening of resistance to indicate the fact. I have found it a safe plan to tie a string about the bougie to mark the point which will be opposite the incisor teeth when the end of the bougie is in the stomach. For a child of two years, this point should be about ten inches from the tip.

I have used these bougies after operation to maintain dilatation, and have felt that I was in little or no danger of having the bougie leave even a lacerated œsophagus. I have not thus far used them for dilating a stricture, but I feel that they would be safe and efficient for the dilatation of such strictures as yield before moderate force.

I have devised an œsophagotome for strictures which are pervious from above and resisting enough to make simple dilatation by bougies impossible or dangerous.

In the *Medical Record* of February 25, 1893, Dr. Abbe reported a case of œsophageal stricture which he dilated by means of a string and bougie. He passed a cord through the œsophagus, and then put the strictured portion upon the stretch by means of a conical bougie pushed up from the stomach. The string was then pulled to and fro, chafing through the stricture and allowing the bougie to advance until the strictured portion was of the caliber of the bougie. In Dr. Abbe's case the string and bougie entered the œsophagus from below by way of a gastrostomy opening, and the string found exit above by an œsophagostomy in the neck. Dr. Abbe had done the œsophagostomy in the hope of reaching the stricture through the neck wound. It was on finding this impracticable that he had the inspiration to chafe through the stricture by the string and bougie. He tells me that his patient remains well to-day with a competent œsophagus, and that a bougie is passed at intervals of six months.

My œsophagotome utilizes Dr. Abbe's ingenious and successful principle of chafing through the distended stricture by

a string which is pulled back and forth. But my œsophagotome is so constructed that the operation is carried out by working entirely through the mouth without opening the stomach. The instrument consists of a stout staff of whalebone, to the end of which is screwed fast an olive-shaped piece of metal. This olive is pierced by two tunnels. One is a curved tunnel having its convexity towards the end of the instrument and its two ends opening opposite one another well forward of the greatest diameter of the olive. This curved tunnel is accomplished by making two borings which meet at an angle. The sharp crest where the borings meet is smoothed down by pulling through a string covered with wet emery powder. Unless the metal is thus smoothed, the cutting string will itself be quickly chafed in two. This tunnel (F, Fig. 1) I have called the string-tunnel.

The second tunnel begins at the base of the olive, to one side of the screw which attaches it to the whalebone staff, and, passing diagonally through the olive, ends at its tip. This tunnel I will call the guide-tunnel (G, Fig. 1). The instrument is held to its course in the œsophagus by a guide-bougie like that used with my hollow bougies. To shield the soft parts of the pharynx from the scraping of the string while cutting, I have made a guard to hold the strings close to the whalebone staff. This guard consists of a handle to which are soldered two wires. These wires run along the whalebone staff and carry three wire loops encircling the whalebone, by means of which the guard may slide along the staff. The wires also carry two sets of lateral eyes in which the cutting strings may play to and fro. The strings are thus held away from the soft parts.

The method of using this instrument is as follows: An olive a little larger than the stricture is screwed to the whalebone staff. The two ends of the string which passes through its string-tunnel are threaded through the eyes of the guard. As a preliminary to using the string, it must be thoroughly soaked and cleared of any kinks or snarls. If the patient be a child, he is best seated in the lap of an assistant, with the shoul-

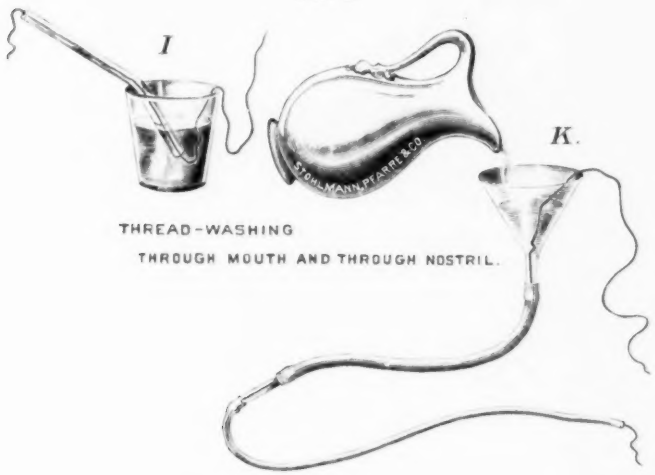
ders resting against a pillow in front of the assistant, and the head thrown back over the top of the pillow, the mouth held open by a gag. A guide-bougie is chosen of such size that it will readily pass the stricture. It is introduced until all but the wire has disappeared behind the epiglottis. The end must then be in the stomach. As no force is required in passing this guide-bougie, it cannot make a false passage. The wire of the guide-bougie is now threaded through the guide-tunnel of the olive, and the olive slid along the wire until its tip comes in contact with the bougie portion of the guide-bougie. By pulling upon the wire and pushing the staff, the guide and olive become now virtually one instrument. As the guide is necessarily in the œsophagus, the olive must follow it, and cannot make a false passage even if a fair amount of force is used. One thing must be guarded against,—kinking the wire where olive and bougie meet, by failing to direct the staff towards the œsophagus while the olive is still in the pharynx. Attention to the position of the patient and proper handling of the whalebone staff will prevent this from happening. When the olive is arrested by the stricture, the guard is slid along the staff until its end is beyond the epiglottis, and then an assistant pulls the string to and fro, pulling parallel to the staff to make as little friction as may be. Moderate pressure is made upon the staff, which causes the olive to put the stricture on the stretch, and the strings cut a passage for it. As the olive descends, the guide-bougie coils up in the stomach. Owing to the slight force required to coil the bougie in the stomach, the olive may not, when it has cut through the stricture, plunge suddenly into the stomach. It is not, therefore, safe to wait for a sense of lessened resistance as an indication that the olive has passed the œsophagus. The safe plan is to mark the whalebone staff at the point which should be at the incisor teeth when the olive is in the stomach.

I have very recently devised, but have not yet used, a modification of this œsophagotome (H, Fig. 1). In this modification the guide-bougie has no wire, but screws into the tip of the olive, and the string-tunnel of the olive is replaced by a hole

in the proximal metal tip of the bougie. In this form of the instrument it is not possible, first, to pass the guide-bougie alone, but it must be passed already attached to the olive. This means that the bougie cannot in difficult cases be passed with the same deftness; but in most cases it would be as easily and as safely passed, and the instrument is less complicated.

For those cases in which it is impossible by careful attempts with variously bent bougies of small caliber to traverse the œsophagus from the mouth my œsophagotome is not available, and a small opening should be made into the stomach. From

FIG. 2.



the stomach it may be possible to pass a small bougie up into the pharynx. If this succeeds readily, a thread may be drawn through, and the dilatation of the stricture may at once be proceeded with by an instrument which I will presently describe. If, however, a bougie introduced into the stomach does not readily find the cardiac orifice, rather than enlarge the opening into the stomach, I would let the patient recover from his anæsthetic, and after some days pass a thread through the œsophagus by a method which, though simple, is, I believe, entirely new. The apparatus consists of a glass of water, an ordinary drinking tube, and a piece of black silk thread

(I, Fig. 2). The tube is threaded so that the end of the thread is at the mouth-end of the tube. The patient then drinks water through the tube. I *wash down* the thread.

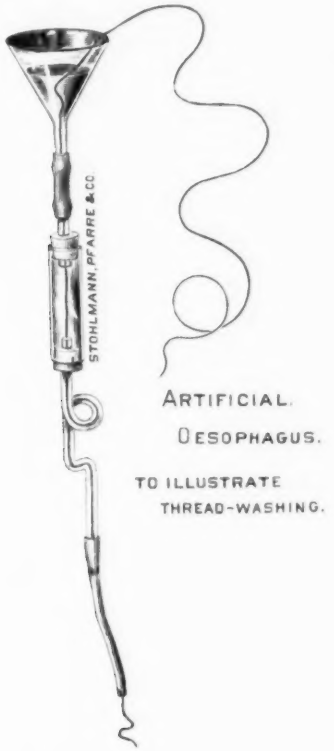
By experiment I have found that it is not a difficult matter to wash a thread through even a complicated system of tubes of various calibers and shapes. Some of the books recommend that, where a thread is to be passed into the stomach, its end should be weighted by a shot to facilitate swallowing. From my experiments and from clinical experience with my method, I feel sure that this weighting of the thread can only help to defeat one's object, and especially so where the œsophagus is strictured, tortuous, or sacculated. I find that the important matter is to have the thread untrammelled, and to allow it to float along with a current of water. The thread should be held slightly in check, so that it shall not pass onward with quite the velocity of the stream of water. If this is done, the tip of the thread is carried in the swiftest part of the current, and will find its way the more readily through places of smaller caliber, because there the current is swifter.

Before trying to wash a thread down the œsophagus of a patient, I first tested the feasibility of doing so upon an artificial œsophagus (Fig. 3). It is made of glass and rubber tubing. The funnel above may represent the pharynx. The channel passes from the neck of the funnel through a piece of rubber tubing and a piece of glass tubing, and then by means of a perforated cork into a glass tube of large caliber. This is intended to represent a dilated pouch above a stricture. The exit below from the large tube is by a small glass tube which passes half an inch into the large tube, to represent the mouth of the stricture as lying at a higher level than the bottom of the pouch. Thence the channel is continued by a piece of rubber tubing, by a piece of glass tubing which takes a circular turn in a vertical plane and then makes a sharp and constricted lateral bend, and the channel finally ends by a rubber tube having a diameter of about one-sixteenth of an inch. If a thread be introduced into the neck of the funnel, and the funnel be kept filled with water and gradually the thread be fed in, the thread

will be carried by the current of water through the whole system without difficulty. Should it be arrested at any point, a momentary pull will disengage it and allow it to pass on.

As stated above, the apparatus which I have used for washing a thread down the œsophagus of a patient consists of an ordinary drinking tube, a glass of water, and a piece of

FIG. 3.



black silk thread. The tube is threaded so that one end of the thread is at the mouth end of the tube. The patient then drinks through the tube. The thread is carried up the tube and on into the œsophagus by the current of water. More thread is fed into the water as it disappears up the tube, care always being taken that it is not fed in too rapidly. When several feet of thread have been thus washed down, the lower portion may be

fished out of the stomach by means of a bent probe passed in at the gastrostomy opening.

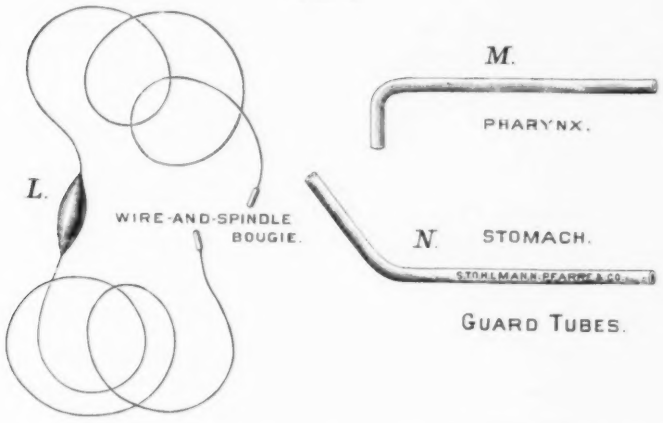
The above method, simple and excellent as it is, may at times fail, because it requires the co-operation of the patient. He must drink, and he must not snarl the thread in his mouth. Where this co-operation has been wanting, I have overcome the difficulty in the following way, also with perfect success.

To a glass funnel I attach a piece of rubber tubing, and to this, by a piece of glass tubing, a small rubber catheter the tip of which has been cut off (K, Fig. 2). A thread is washed down from the funnel until its end appears at the end of the catheter. The rubber tubing is now pinched to stop the flow of water and thread, and the catheter inserted into a nostril until its end hangs in the pharynx. A swallow of water is allowed to flow from the funnel, and then the tube is again pinched. Water is thus intermittently fed down the œsophagus, the thread going with the stream. After several feet of thread have disappeared down the funnel, the lower end of the thread is fished out through the gastrostomy opening as before.

Having got a thread through the œsophagus from the gastrostomy opening to the mouth, I next draw through a stouter double thread. There are thus two threads passing through the œsophagus. By one of these I pull through a stout linen fish-line. By the other I pull up one of my wire-and-spindle bougies. The wire-and-spindle bougie (L, Fig. 4) consists of a piece of wire five feet long, tipped at each end by a tiny knob, and carrying at its middle a spindle-shaped piece of metal. I have had made a series of these bougies carrying spindles of different diameters from No. 10 French up. By the thread I pull up the smallest size. If its spindle passes the stricture, I lash the other end of its wire to the wire of the next larger size, and by the first one pull up the second, and so on until a spindle is arrested by the stricture. When this happens the wire is kept taut, causing the spindle to put the stricture upon the stretch, and then the fish-line is pulled to and fro. A way is quickly cut for the spindle and it passes up to the

mouth. Wires carrying successively larger spindles are then drawn up and the stricture cut upon them until the caliber is deemed sufficient. To guard the soft parts of the stomach and pharynx from injury by the fish-line and the wire, I have made them play in two guard-tubes, which consist of aluminum tubing (M, Fig. 4), one being bent to pass into the pharynx

FIG. 4.



behind the larynx, and the other (N, Fig. 4) bent to pass through the gastrostomy opening and up to the cardiac orifice. These guard-tubes effectually protect the soft parts of the pharynx and of the stomach, and the fish-line plays easily through them. As soon as a way has been cut for a spindle, it is heard and felt to click against the upper guard-tube.

In contriving these instruments, I have had constantly in mind the fatal results which follow when an instrument leaves the œsophagus and punctures the vital structures which so snugly enwrap it. Each of my instruments follows a guide, and the guide is in each case introduced with so little force that one may feel sure that it cannot make a false passage. I have endeavored, also, to reduce to a minimum operative interference by the knife. I feel that the method of passing the œsophagus by washing down a thread obviates all necessity for making a large opening into the stomach. When once a thread has been passed, the wire-and-spindle bougies make it possible to dilate any stricture, and, I believe, with comparative safety.

KNIFE-BLADE REMOVED FROM LUNG.

BY JAMES FAIRCHILD BALDWIN, M.D.,

OF COLUMBUS, OHIO,

Surgeon to Grant Hospital.

IN the ANNALS OF SURGERY of July, 1902, is a report by Korteweg, of Leyden, of a case in which he removed from the lung a piece of lyddite-shell which had penetrated it about six months before his operation. The date of his operation was October 31, 1900. According to the statistics which he gives, his case would be the second in which a foreign body had been extracted from the lungs through an external incision.

It would seem reasonable to believe that the number of such cases is small, simply because surgeons have failed to report them. Nevertheless, it is not likely that the number of cases would be large were all reported, since death usually occurs pretty promptly after an injury of the kind under consideration.

On the 20th of June, 1898, H. S., of Dotson, West Virginia, was referred to me by Dr. Hatfield. The patient was a vigorous young man, aged about twenty-eight years, who, while acting as a deputy-sheriff, was stabbed by a prisoner whom he was trying to arrest. The prisoner used an ordinary cheap pocket-knife, and the blade broke off in the lung, the wound of entrance being in the right side just below the axilla. The injury had been inflicted April 1, three months before his coming under my observation. The wound had healed promptly, but there developed soon after symptoms of disease in the injured lung, and at the time when I saw him his general condition was quite similar to that of a patient well advanced in consumption. The point of consolidation could be easily mapped out, and in this region were many coarse râles. There was a good deal of purulent expectoration, and the ordinary manifestations of infection were pronounced.

Three radiographs were taken showing anterior, posterior,

FIG. 1 shows blade in right lung.

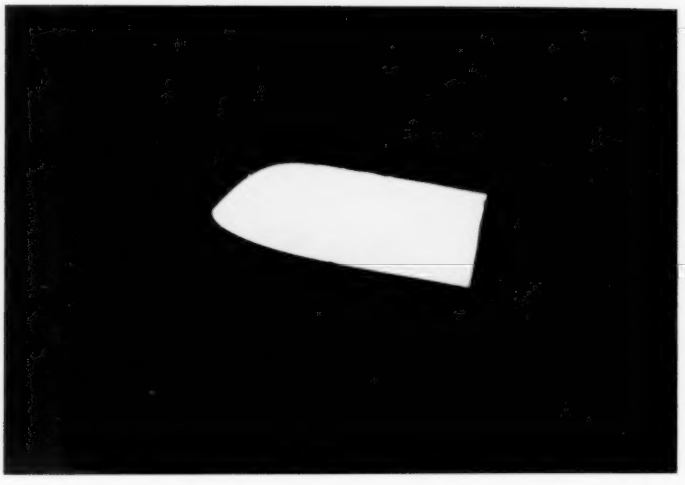


FIG. 2.—Exact size of blade removed.

and lateral views. All of them showed the blade quite distinctly, but the anterior view was the most distinct.

The patient was operated upon at the Protestant Hospital, June 23, 1898, more than two years before the operation by Korteweg. The operation consisted in resecting about an inch of the overlying rib, the incision being made in the axillary line just below the scar left by the wound of entrance. It was expected that adhesions would be found at this point, so that the pleural cavity should not be opened, and in this we were not disappointed. A finger was pushed into the lung substance without difficulty, and thus hæmorrhage was obviated. The blade was encountered at a depth of about a finger's length, and forceps being introduced along the finger the blade was extracted. Drainage was introduced, and for several days there was considerable purulent discharge from the cavity in which the blade had been lying, this discharge being of a most offensive nature. It lasted, however, but a short time, and the patient was able to return home, with the wound healed and in greatly improved health, sixteen days after the operation. His recovery was prompt and complete.

ACUTE YELLOW ATROPHY OF THE LIVER AS A SEQUELA TO APPENDECTOMY.[1]

BY MAX BALLIN, M.D.,

OF DETROIT, MICHIGAN.

ACUTE yellow atrophy of the liver is a rare disease; according to Osler about 250 cases are on record. This affection is also called Icterus gravis, Fatal icterus, Pernicious jaundice, Acute diffuse hepatitis, Hepatic insufficiency, etc. Acute yellow atrophy of the liver is characterized by a more or less sudden onset of icterus increasing to the severest form, headaches, insomnia, violent delirium, spasms, and coma. There are often cutaneous and mucous hæmorrhages. The temperature is usually high and irregular. The pulse, first normal, later rapid; urine contains bile pigments, albumen, casts, and products of incomplete metabolism of albumen, leucin, and tyrosin, the presence of which is considered pathognomonic. The affection ends mostly fatally, but there are recoveries on record. The findings of the post-mortem are: liver reduced in size; cut surface mottled yellow, sometimes with red spots (red atrophy), the parenchyma softened and friable; microscopically the liver shows biliary infiltration, cells in all stages of degeneration. Further, we find parenchymatous nephritis, large spleen, degeneration of muscles, hæmorrhages in mucous and serous membranes.

The etiology of this affection is not quite clear. We find the same changes in phosphorus poisoning; many believe it to be of toxic origin, but others consider it to be of an infectious nature; and we have even findings of specific germs (Klebs, Tomkins), of streptococci (Nepveu), staphylococci (Bourdillier), and also the Bacillus coli is found (Mintz) in the affected organs. The disease seems to occur always secondary to some other ailment, and is observed mostly during pregnancy (about one-third of all cases, hence the predominance in women), after

[1] Read before the Wayne County Medical Society, January 5, 1903.

typhoid fever, recurring typhoid, sepsis, syphilis, gonorrhœa (Aufrecht), sclerema neonatorum, and severe nervous shock (Albu); further on in phosphorus, antimony, and arsenic poisoning. As a sequel to operation, I have found only nine cases of acute yellow atrophy of the liver on record, therefore I consider the following case worthy of relating:

Mr. G. D., twenty years old, brass-worker, from healthy family.

Previous History.—Several times during the last two years, that is, since D. is working as brass polisher, slight lead colics. During the last year twice typical attack of appendicitis. No alcoholism. No venereal diseases.

Present sickness began on December 8, 1901, as another well characterized attack of appendicitis. I saw the young man first, in consultation with Dr. J. G. McAlpine, on December 9, 1901, at 3 P.M., thirty-six hours after onset of the appendicitis. I found temperature 101° F.; pulse, 98. Tongue very dry and coated. Respiration quiet. Face expression good. Abdomen flat. Muscular tension in right side. Ileocæcal region very painful. No dulness on percussion. Patient was somewhat restless and felt chilly. Operation recommended, but delayed, on account of absence of father, until 11.30 P.M. same day, at Detroit Sanitarium. Intramuscular incision. Appendix adherent to side of abdomen. Adhesions broken. Serosa of appendix covered with fibropurulent exudation. Meso-appendix thickened, also cæcum. Ligature of appendix. Stump touched with carbolic acid. Inversion and overstitching impossible, as thread cuts through infiltrated tissue. But as all tissue seemed to be able to recover, the abdominal cavity was closed tight by suture in layers. Operation lasted twenty-five minutes. Chloroform narcosis was tolerated well. Only a small amount of chloroform was used. Pulse after operation, 96.

December 10, 1901. 9 A.M. Temperature, 98.6° F.; pulse, 100. Night: Restless and nauseated. Urine by catheter, eighteen ounces; later, spontaneous. Bowels moved after glycerin injection. Feels generally well. 6 P.M. Temperature, 98.4° F.; pulse, 94.

December 11, 1901. 8 A.M. Temperature, 98.4° F.; pulse, 82. Night: Fairly well. Slight jaundice of skin and conjunc-

tivæ. Several times slight vomiting. Somewhat restless in the afternoon. 8 P.M. Temperature, 97.6° F. (axilla); pulse, 88.

December 12, 1901. 7 A.M. Temperature, 98.8° F.; pulse, 88. Jaundice increased. Hunyádi water vomited. Evening restless and slightly delirious. Vomiting of greenish fluid at 5 P.M. 6 P.M. Temperature, 98° F.; pulse, 84.

December 13, 1901. 8 A.M. Temperature, 98° F.; pulse, 86. All night delirious and very noisy, slept only for short intervals, like in deep coma. Threw about his arms and legs violently. Jaundice increased. Afternoon vomited three times small quantities of black fluid. 5 P.M. Stomach washed out. He was so violent that he had to be held by three men while the stomach was washed. A small amount of brown fluid was found in the stomach, which contained disintegrated red blood-corpuscles. After washing, two ounces saturated solution of Epsom salts were left in the stomach. Stupor continued all day, changing to wild delirium. Bowels moved copiously at night. Bandage changed. Skin suture removed. Wound does not show any reaction, only a little bile-colored serum discharged from same. 7 P.M. Temperature, 100° F.; pulse, 116.

December 14, 1901. Temperature, 100.4° F.; pulse, 108. Delirium and coma seem to increase. Stool and urine involuntarily. No response to loud calling, pinching, pricking, etc. Yelled loudly and threw about his arms and legs. Stool contained bile like in severe chorea. In order to keep him in bed, two men had to hold his limbs all the time, and, as this caused too much strain, legs and arms had to be tied to the bed. Jaundice increased to a deep brown color. Patient swallows food after it is introduced forcibly between the teeth. There was no more vomiting since lavage of stomach. Bromide and codeine given in enema. 8 P.M. Venesection of right median vein, 300 cubic centimetres of blood removed. Intravenous saline infusion of 500 cubic centimetres. 8 P.M. Temperature, 102° F.; pulse, 124.

December 15. 7 A.M. Temperature, 102° F.; pulse, 138. Rested some after venesection. Perspired freely, so that all the bed-clothing was yellow with bile-stained perspiration. Also diuresis seemed to have been freer but involuntarily. Coma and delirium continue. Swallows food like yesterday. Urinated involuntarily. Examination of some urine gained by catheter shows albumen, casts, bile, and crystals of leucin and tyrosin.

Bromides, digitalin, bovinin, and saline solution are given in enema. 8 P.M. Temperature, 98.8° F.; pulse, 106.

December 16. 9 A.M. Temperature, 99.6° F.; pulse, 120. Rested more quietly during the night. Begins to respond a little, but is still mostly in a stupor. Icterus a little lighter. Liver-dulness small, one and one-half inches above rib-bow. Abdomen otherwise flat. Some punctiform hæmorrhages on arms and legs. Wound without any inflammatory symptoms.

From now on all the symptoms decreased in intensity, pulse went down, temperature remained about normal, icterus disappeared gradually, and consciousness returned slowly. Patient got up on the 5th of January, and left the hospital on February 11. At that time there was still some jaundice and small liver-dulness.

Reviewing this record, we have the case of a young brass-worker operated upon for an acute appendicitis. The appendix, cæcum, and omentum were quite inflamed and swollen. The first three days after the operation everything looked favorable except a slight icterus. Then in the fourth night serious delirium developed, very violent spasms set in, only to be interrupted by a deep comatose condition. At the same time deep icterus existed, hæmorrhagic masses were vomited, bile, albumen, casts, leucin, and tyrosin appeared in the urine, the liver-dulness was much diminished. This serious condition lasted five days, to yield finally to a slow improvement.

There can be no doubt but that we had to deal with a case of acute yellow atrophy of the liver after an appendectomy under chloroform. We saw all the typical symptoms: icterus, delirium, spasms, coma, fever, leucin, and tyrosin in the urine. Even the small liver-dulness could be percussed. I think that every one would agree with my diagnosis if I could add to the record of the case an autopsy report! Indeed, recoveries after acute yellow atrophy of the liver are so exceptional, that, for instance, Sajous, *Annual Cyclopædia* (1899, Vol. v, page 395), says, "The disease is so fatal that recovery almost implies a mistake in diagnosis." But, as I mentioned before, there certainly are some recoveries of undoubted cases of this sickness

reported. Weising could gather sixteen cases of favorable termination. I was able to find some more recoveries recorded (Albu, Dobie, Laigne-Lavastine). Senator believes in possibility of recovery, so does Bouchard and others. Nevertheless, the mortality seems to be about 95 per cent.

As already mentioned, very few similar cases after operation are on record. I could find only nine, none of them in this country. The following table will give particulars of these ten cases.

All these ten cases have in common that one or two days after an operation a slight icterus developed, followed by vomiting of sometimes bloody character, serious delirium, coma, and in nine out of ten cases death. Four of the patients were male, three female—in three the sex is not mentioned. Their age varied between twenty and forty-two years. In seven cases chloroform was used as an anæsthetic, once Billroth's chloroform mixture; in two cases the anæsthetic is not named. As predisposing causes alcoholism is given in three cases (Cases 1, 7, and 9); indigestion twice (6 and 8); once with slight catarrhal icterus (6); lead once (10). In one case the affection followed herniotomy with resection of adherent omentum (4); in three cases uterine or adnexa operations; one of them removal of an ovarian cyst with torsion and necrosis of the pedicle (5); one a hysterectomy with morcellement of uterine fibroids (6), and one removal of the adnexa for chronic salpingitis; twice an appendectomy (6 and 10), both cases with inflammation and suppuration, and one time the only operation not abdominal, a very difficult teeth extraction from suppurating jaws (8). The clinical history of Bastianelli's cases was not obtainable; I could not get a copy of his essay and had to content myself with a short excerpt. Autopsies were made in all nine fatal cases and showed every time the serious degenerative condition of the liver, besides nephritis and degeneration of the heart muscle. Multiple punctiform hæmorrhages of mucous membranes were found three times. Mintz found in his case the bacterium coli in the liver parenchyma.

After this analogous experience of six different authors in

TABLE OF CASES OF POSTOPERATIVE ACUTE YELLOW ATROPHY OF THE LIVER.

No.	Author.	Age.	Sex.	Predisposition.	Anæsthetic used.	Operation performed.	Onset of Icterus.	Symptoms.	Result.	Autopsy.
1	Bastianelli.	?	?	?	Chloroform.	?	?	Icterus, vomiting, delirium.	+ between second and tenth day.	Fatty degeneration of heart. Slight nephritis. Punctiform hæmorrhages.
2		?	?	?		?	?			
3		?	?	?		?	?			
4	Bandler.	42	Male.	Alcohol.	Eighty grammes of chloroform.	Herniotomy, with resection of adherent omentum.	One to two days.	Icterus, delirium, coma; temperature, 40° C.	+ on fourth day.	Acute yellow atrophy of liver. Icterus universalis. Multiple hæmorrhages. Nephritis.
5	Stocker.	?	Female.	?	?	Ovarian cyst, with torsion and necrosis of pedicle.	?	?	+	Acute yellow atrophy of liver.
6	Erlach, reported by Bandler.	?	Female.	Catarrh, icterus.	Billroth mixture.	Extirpation of uterus, with morcellement of fibroma.	?	Icterus, delirium.	+	"Atrophia hepatis acuta rubra et flava."
7	Mintz.	40	Male.	Alcohol.	?	Appendicitis, with abscess.	One day.	Icterus, hæmatemesis, convulsions, fever.	+ on sixth day.	Fatty degeneration of heart. Parenchyma. Nephritis. Acute yellow atrophy of liver. Bacterium coli in liver. Erosions in duodenum and stomach.
8	Marten.	34	Female.	Insanity, indigestion.	Seventy c.c. of chloroform in 40 minutes.	Extraction of fourteen teeth from suppurating and necrotic jaw.	One day.	Icterus, vomiting, albumen, casts in urine, delirium, yelling, coma.	+ on fourth day.	Fatty degeneration of heart, kidneys. Acute fatty degeneration of liver.
9	Cohn, of Sonnenburg's Clinic.	21	Female.	Alcohol.	Chloroform.	Salpingo-ovarectomy for pustubes.	Two days.	Icterus, fits of yelling, delirium, albuminuria.	+ on fifth day.	Cloudy swelling of heart, liver, kidneys. Icteric nutmeg liver.
10	Ballin. (Author's case.)	20	Male.	Lead.	Chloroform.	Appendicitis in inflammatory stage; adhesions.	Two days.	Icterus, delirium, coma, fever, bloody vomiting, albumen casts, tyrosinecein in urine.	Recovery.	

ten cases, it is evident that acute yellow atrophy of the liver may occur as one of the rarer complications after operations. Our text-books, some of them with otherwise very exhausting chapters on the complications of the post-operative period, and many special essays on the same topic, do not mention this rare complication at all, at least as far as I have been able to look this up.

As to the etiology of this serious degenerative process in the liver after operations, the few observers disagree in the same line of thought as the authors on the etiology of acute yellow atrophy in general. Some believe it to be of toxic origin; others, of infectious nature. Bandler, Bastianelli, Marten, and Cohn consider the chloroform used in narcosis to be the cause. Mintz found bacterium coli in the affected liver and thrombotic processes in the duodenal arteries, and believes, therefore, in infectious origin. The advocates of the theory that chloroform causes the degenerative process in the liver bring forward many arguments in favor of their opinion. First, a mild icterus after narcosis with chloroform is observed quite often, as first pointed out by Nothnagel in 1866. By experiments on animals, Nothnagel, Toth, Unger and Junker, Stromel, Strassmann, and Ostertag showed beyond doubt that chloroform causes degenerative changes of the liver cells analogous to changes in kidneys and heart muscle. Bandler repeated the same experiments, and compared them with findings after ether inhalations. Chloroform always gave said degenerative changes, ether never.

In men Nothnagel studied first the action of chloroform on the liver, as already mentioned, further on Thiem, Fischer, Fraenkel, and others could always find in cases of chloroform death, degeneration of the liver concurring with destructive changes in kidneys, heart, and muscles. Luther showed on a series of cases that bile in the urine and icterus after chloroform comes and goes with albuminuria. Hence, we have first the clinical observation that chloroform causes sometimes icterus, then we have the proof of autopsies in cases of chloroform death that this anæsthetic can produce degeneration of liver

cells, and finally we have the proof by experiments on animals. Therefore, the conclusion that the acute yellow atrophy in the cases under consideration is simply caused by the chloroform seems to be justified. The experience of our ten tabulated cases shows that chloroform was used seven times; in three cases no mention is made of the anæsthetic used; there is, anyway, as far as I could find out, no such case on record after an ether anæsthesia. But looking over the history of the seven cases,—excepting the three cases of Bastianelli, without an exact clinical history,—we find that in every case an inflammatory condition existed at the time of operation (abscess, appendicitis, torsion of pedicle, etc.). There is no record of any case after an operation in healthy tissue. Six of the operations were laparotomies; only one was outside the abdomen,—the tooth extraction with necrosis of the jaw. This leads to the supposition that infection, furthermore, the handling of inflamed intestines and omentum, is also an important factor. We saw this destructive liver process happen after the same kind of operations after which we meet with thrombosis of the femoral vein, lung infarcts, and other complications of thrombotic and infectious origin. Finally, we must not overlook the fact that some disposition lessening the resistance of the liver cells, as alcoholism, lead or catarrhal jaundice, was recorded in nearly every one of our cases. Considering this, it seems probable that acute yellow atrophy of the liver, after operation, is caused by infectious processes with the help of the toxic influence of chloroform upon the liver. A predisposition by alcohol, etc., as mentioned, seems to be essential as causative factor; however, more observations are needed to clear this etiology. For instance, if some one could report a similar case after ether inhalation, we would have to abandon the idea of chloroform being a causative factor.

In nearly every one of the cases considered we find hæmorrhagic vomiting as a symptom with the malign jaundice. There seems to be some relation between the degenerative process of the liver as described and hæmorrhagic vomiting after operation, as Billroth, von Eiselsberg, Landow, and others

have reported. All the later cases happened after serious laparotomies with omental resections, etc., and their autopsies showed multiple fresh ulcerations of stomach and duodenum, which were also found in Mintz's case of acute yellow atrophy of the liver. Eiselsberg believes the ulceration to be caused by septic thrombotic processes, while Landow considers the chloroform to be their cause. Hæmorrhagic vomiting is observed as a symptom in most cases of acute yellow atrophy of the liver; Landow, on the other hand, observed in one of his cases of hæmatemesis after appendectomy, simultaneously severe icterus, although without delirium. This is the reason that I suspect some relation between the two rare complications of the postoperative period, viz., between the hæmatemesis and the malign jaundice. Maybe both are caused by the same factor, chloroform or infection; maybe the primary changes in both cases are located in the red blood-corpuscles which are essential in carrying the chloroform through the body (Pohl), and also in thrombotic infections. Further observations and experiments will throw light on these questions.

As to the treatment of postoperative yellow atrophy of the liver, our cases give us first a lesson in prophylaxis. The long use of chloroform should be avoided where alcoholism or some other chronic ailment has caused a catarrh of the liver ducts, especially when we have to deal with inflammatory conditions of the viscera. The narcosis, if deemed advisable, can be started with chloroform, but after a short time ether should be substituted; we have to consider that this serious liver affection is at least partially a consequence of chloroform. In a recent publication on "The Accidents of Anæsthesia," Eisendrath supports the same idea by saying, "Chloroform should never be given when it is necessary to administer it for more than an hour, on account of its degenerative effect upon the heart muscle and parenchyma of the liver and kidneys."

If we have to deal with a case of malignant jaundice, the odds are surely against us. Recovery will be the exception. The success in my case I attributed mostly to the venesection and the following intravenous saline infusion. The malign jaundice is the consequence of a destructive liver disease, just

the same as uræmia is a sequela to degenerative processes in the kidneys. The French term for the affection "hepatic insufficiency" characterizes this condition. Considering some good results had with venesection and saline infusion in the treatment of eclampsia, I decided to try the same treatment in my case, which seemed then almost beyond hope. The result was a free diuresis and abundant bile-stained perspiration, just as I had noticed the beneficial influence of the same treatment in uræmia. Bouchard mentioned that all the cases of acute yellow atrophy of the liver which recovered showed this "polyuric crisis," that is, a sudden, large diuresis. Besides the venous infusion after venesection, cathartics, diuretics, and rectal enemata will contribute to the same end, to a speedy and thorough elimination of the toxin produced by the insufficiency of the liver.

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PRIMARY RETROPERITONEAL SOLID TUMORS.

WITH REPORT OF A CASE.

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Miss D. C., a native Tennesseean, aged thirty-one years, of healthy parentage, had typhoid fever six years ago, and with this exception enjoyed good health until the summer of 1901. From that date she has suffered with frequent attacks of abdominal pain accompanied by vomiting and obstinate constipation. Her average weight prior to 1901 was 120 pounds; during the autumn of that year she gained flesh rapidly, and on January 1, 1902, weighed 150 pounds. At this date she first noticed a swelling in the epigastric region, which grew perceptibly, distending the entire abdomen. Palpitation, difficult breathing, obstinate constipation were constant features, varied by seizures of severe pain and vomiting, recurring at intervals of about ten days. Otherwise, her general health remained good; there was no menstrual disorder or urinary disturbance.

During last August her suffering was more prolonged and intense than usual, and she was brought to me on the night of August 12. The physical examination disclosed a peculiarly distended abdomen; its shape was somewhat cylindrical, with circumference as great at the epigastric as at the umbilical and subumbilical zones; the flanks were not bulging. The enlargement was greater than that of a full term pregnancy. The tumor was tense, elastic, but not fluctuant, slightly lobulated, and produced symmetrical enlargement. The tumor was everywhere dull upon percussion, no area of resonance separating it from liver-dulness. There was fixed dulness in the right flank. In the left iliac and lumbar regions tympany was elicited, also over a small area close to Poupart's ligament on the right side. Combined vaginal and abdominal examination revealed a virgin uterus crowded to the floor of the pelvis by a soft yielding mass, which entirely filled that cavity. The appendages could not be defined. Urinary analysis was negative; the quantity of urine voided in the eighteen

hours in which the patient was under observation was insufficient. There was no cachexia, œdema of extremities, venous varicosity, or glandular enlargement. The patient appeared well nourished and in good health save for the cramping pains in the abdomen from which she was then suffering. These were ascribed to partial intestinal obstruction from pressure.

With abdomen open, the tumor presented every appearance of an ovarian cyst. The signs pointed so clearly to presence of fluid that a trochar was used, but no fluid was obtained. It was impossible to pass the hand down into the pelvis to ascertain the relations of the tumor, hence the wound was enlarged upward. The tumor was now found to lie retroperitoneally, encircled by the colon. Its enucleation seemed feasible. The parietal peritoneum over its most prominent surface was divided, and the mass quickly and easily enucleated from its bed in the cellular tissue of the loin to the right of the spinal column. It grew between the folds of the ascending mesocolon, and in its removal there was but little disturbance of the vascular supply of the gut. Hæmorrhage was very slight, controlled by hot pads. The bed of the tumor was lightly packed with gauze, and the incision in the posterior parietal peritoneum sutured, save a small opening for the gauze drain.

At this writing, four months from the date of operation, the patient is well.

The tumor, when removed, weighed fourteen and one-half pounds. It was submitted to examination by Dr. Larkin Smith, Director of the Laboratory of Pathology, University of Nashville, who reported that it was a lipomyxoma with a round-cell sarcomatous base, the large mass of the body of the tumor being composed of almost pure myxomatous tissue with a few elements of adipose tissue scattered through it.

Definition.—The term primary retroperitoneal tumor implies a solid neoplasm growing behind the peritoneum or between its folds, and not genetically connected with any of the retroperitoneal organs.

Frequency.—There seems to be an impression among surgeons that these tumors are so rare that they are scarcely worth consideration, and this is borne out somewhat by Mr. Lockwood's statement that no specimen of retroperitoneal sarcoma,

which is the most frequent form of tumor, had been presented to the Pathological or Medical Society of London prior to 1895. In a recent discussion in the Medical and Chirurgical Society of London, following a report of a case by Mr. Sheild, it appears that the members were quite unfamiliar with the subject. The author read a paper before a body of America's leading surgeons, and none present had had any operative experience with these tumors, yet numerous cases are recorded, especially within the last few years.

Varieties.—The types of retroperitoneal tumors belong to the connective-tissue group. The innocent tumors are *lipoma, myxoma,* and *fibroma;* the malignant is *sarcoma.* In analysis of twenty cases of solid retroperitoneal tumors collected by Rogowski, sarcomatous tissue was found in every one.

Etiology.—There is nothing definitely known as to the cause of these tumors; but from instances quoted above and others found in the literature it seems that sarcomatous degeneration is engrafted upon pre-existing innocent growths, whose presence has been recognized for many years. There is one instance in which pre-existing retroperitoneal, possibly subdiaphragmatic, abscess may have had some causal relation.

Age. They usually occur after maturity, between the ages of thirty and fifty years. Primary sarcoma is very rare in children, yet Arnstein collected ten cases, including one of his own, a female four years old.

Sex. It occurs with equal frequency in both sexes.

Pathology.—Origin. The structures involved primarily show that these growths originate in the retroperitoneal cellular tissue, retroperitoneal and mesenteric glands, from the sheaths of the great blood-vessels, and from the vertebræ. In one inoperable case of fibrosarcoma upon which I made an autopsy, the tumor appeared to arise from the root of the mesentery, its other attachments being very slight.

In a case recently operated upon, the origin of the tumor was in the sacrum; the growth lay entirely in the pelvis.

Sarcoma. As above stated, sarcoma is the predominating tumor. The microscopical picture is generally of the spindle-

celled sarcoma, yet in literature we meet with such descriptive terms as myxosarcoma, liposarcoma, lymphosarcoma, and cystic sarcoma. The last variety is so closely allied to cysts that Moynihan classifies it as one of the varieties of mesenteric cysts.

An important pathological characteristic of retroperitoneal sarcomata is that they are encapsulated, yet metastases occur in about one-half the cases; liver, lungs, and mesenteric glands are the parts involved. These tumors sometimes attain to an enormous size. In Waldeyer's case, quoted by Rogowski, the sarcoma was joined by a large fatty tumor. Other cases are reported of sarcoma associated with other growths.

Lipoma. A most characteristic specimen of lipoma was obtained at autopsy by the late Professor Mudd, of St. Louis; the tumor weighed sixty-six pounds, and had a distinct fibrous capsule.

Fibroma. I removed post-mortem a tumor that had existed fifteen years, entirely unconnected with any of the viscera, which was distinctly encapsulated and attached by a strong, broad pedicle at the root of the mesentery. It was declared by the pathologist to be a myofibroma.

Symptoms.—Retroperitoneal tumors possess certain well-marked characteristics not found in primary intraperitoneal neoplasms. The latter originate primarily between the duplications of the peritoneum and are attached to the organ from which they spring; while retroperitoneal tumors originate in the retroperitoneal space, unattached to viscera, and as they develop they encroach upon the peritoneal cavity, pushing the organs contained therein either forward or to the side in a most typical manner (Witzel).

A patient bearing an innocent retroperitoneal tumor of moderate size may evince no constitutional disturbance; but usually the large size of the tumor causes disturbance of the digestion and respiration. The kidneys are frequently displaced and compressed by the growth. The blood-vessels and lymphatics are obstructed. The intestines may be occluded by pressure. Consequently, general emaciation is one of the most constant and oftentimes the only symptom, barring the presence

of the tumor, of innocent neoplasms. But unfortunately, as we have shown, these tumors are often primarily malignant, as is evidenced by the rapidity of their growth and the early and pronounced cachexia.

Pain, when present, is usually due to constipation, with threatened obstruction, and may be associated with nausea and vomiting.

Tenderness is absent unless there is peritoneal involvement.

In many instances, from pressure, metastatic glandular involvement, and peritoneal irritation, we find ascitic fluid, often of such quantity as to obscure the physical signs. A valuable symptom, and one which not infrequently occurs early, is œdema of the extremities. As before stated, the renal secretion is often disordered, but in only one instance has blood been found in the urine.

Physical Signs.—Inspection. The appearance of the abdomen in these growths is by no means characteristic. They grow anteriorly, as Vander Veer says, in the direction of least resistance. The greatest swelling is usually in the upper portion, at or above the umbilicus. When of large size they may produce a very pendulous belly (Mudd's case). The abdominal distention is usually asymmetrical. The size and location of the tumor, therefore, influence the morphology. The superficial veins are very much enlarged, and respiratory movements of the tumor may be observed. In Ransohoff's case the tumor lay chiefly in the right side, and moved distinctly with respiration. Especially in mesenteric tumors is the function of the intestines impaired; this obstructive feature, being chronic in character, develops intestinal hypertrophy, and I have observed distinct peristaltic patterns in one case.

Palpation. Tumors mesenteric in situation are exceedingly movable, while those close to the parietes are fixed. They are usually smooth, with their borders distinctly defined. They are firm in some instances, elastic, but not fluctuant unless undergoing cystic degeneration. In Mudd's, Ransohoff's, and Guillemain's cases of large retroperitoneal lipomata, fluctuation was apparently distinct. Lipomata impart a sensation more

like that of the liver, and they are often lobulated. Palpation and conjoined manipulation will negative their association with the pelvic and other organs.

Percussion. This note varies with the size and position of the tumor. That this sign may be employed to the full of its diagnostic value, the bowels should be freely evacuated, and the patient should be examined after colonic inflation with gas, and in different positions. Auscultatory percussion is of infinite value in determining intestinal relations. Assuming the case to be one in which the tumor is of moderate size, say as large as a child's head, if central in position, it is surrounded by a zone of resonance; if lateral in position, the resonance is at the umbilical border. But one essential and characteristic feature of these retroperitoneal tumors is that there is fixed linear resonance, elicited by light percussion, either upon one side or across the surface of the tumor. As Witzel says, in these retroperitoneal tumors the colon bears a typical and most diagnostically important relation. We must remember that these tumors originate near the spine; therefore, when small, the colon may be to the outer side. As they grow the colon lies in front; and when they attain to great dimensions the colon lies across or to the umbilical border. In small mesenteric growths the overlying intestines may give central resonance; it is in this form of tumor that a change of position will give us varying resonance. The accompanying ascites, which is not an infrequent complication, will often obscure the presence of the tumor, or mislead us by varying dulness.

One of the most important of the diagnostic signs, revealed both by percussion and palpation, is that the tumor is separable from the solid viscera; yet in tumors of large size with right lateral evolution the colon, ascending and hepatic, is displaced downward and to the centre, and there is no differential resonance between the liver and the tumor. If the patient is examined in Trendelenburg posture, an area of resonance in the lower zone of the abdomen, skirting the pubis and Poupart's ligament, can usually be outlined. This is of immense value in eliminating uterine and ovarian growths.

Complications.—The most usual complications occurring in the course of solid mesenteric tumors are ascites and intestinal obstruction.

Differential Diagnosis.—Innocent growths are recognized by their long duration and the comparative absence of symptoms; and fatty tumors, especially, by their lobulated character, elastic, almost fluctuant feel.

The malignant tumors are rapid in growth, produce complications of ascites and œdema, and are quickly productive of cachexia.

Tumors of the solid viscera, spleen, kidneys, and liver may be mistaken for these growths; yet the functional and constitutional disturbances, and carefully applied physical tests, should make the differentiation.

Prognosis.—The prognosis in lipoma and other forms of innocent tumors is ultimately as grave as in sarcoma, the disturbances from pressure finally bringing about death from marasmus. And, as we have shown, the possibility of change to malignancy must be taken into consideration.

As illustrative of operative results, we would refer especially to the successful case of Harris and Herzog, who removed a large lymphosarcoma, and with it fifty-one centimetres of attached intestine. The patient recovered. Also the case of Shepherd, of a fibromyxoma weighing thirteen pounds, with resection of seven feet and eight inches of intestine, with recovery and restoration of his patient to health.

Contraindications to Operation.—Pronounced cachexia, metastasis, and manifest universal attachments are contraindications that interdict even exploratory incision. After opening the abdomen, which procedure in every case is more or less exploratory, the relations and attachments of the tumor may contraindicate further effort.

Surgical Indications.—The known encapsulated character of retroperitoneal sarcomata, and oftentimes their long duration without metastasis or cachexia, encourage the surgeon to undertake operation. The dangers presented are hæmorrhage and necrosis of the intestines or parietal peritoneum.

The surgical procedure is enucleation of the tumor, but in doing this we must bear in mind that the intestinal circulation may be cut off. When its integrity is impaired, resection of the gut, as in the cases above quoted, is necessary. Drainage must be provided, and is usually best obtained through the loins.

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CLOSURE BY SUTURE OF INTESTINAL PERFORATIONS COMPLICATING TYPHOID FEVER.[1]

REPORT OF THREE CASES.

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In the case of the one patient in this series who survived the surgical intervention, the interesting feature was presented of a faint omental agglutination well occluding a very recent perforation. This observation suggests the surmise that had the therapeutic measures directed towards intestinal immobilization, as advocated by Ochsner, been rigorously observed, Nature's result, instead of a surgical closure of the lesion, might have been equally gratifying.

It is not intended by this citation to advocate the slightest procrastination in dealing surgically with this most serious complication of typhoid fever,—quite the reverse,—but to note the importance in cases where operation has to be delayed or is absolutely refused, of utilizing every possible resource which may aid Nature's effort to seal the intestinal defect by maintaining undisturbed the opposing serous surface, preferably of the omentum.

Speculative interest attaches also to the larger and firmer omental adhesion met with in the same patient. Did it represent a preperforative precaution, or the successful closure of a perforation antedating the other and yet occurring without recognizable symptoms? Or was it a more securely attached agglutination about a perforative lesion of the same date as the one treated by suture?

Finally, what is the ultimate behavior of these omental adhesions? If they persist, may they gradually stretch and

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offer a sufficient source of future danger as bands to justify severance and the substitution of sutures?

CASE I.—A woman, twenty-one years of age, was admitted to the medical service of the Presbyterian Hospital, July 12, 1902, suffering from typhoid fever. Her illness had begun gradually two weeks before with chilly sensations, headache, malaise, anorexia. She had three epistaxes in first days, vomited once or twice. Throat a little sore. Diarrhœa began early and continued until admission. Four to six loose movements a day without pain. Character of stools not noted.

Five days before admission she went to bed on account of increased prostration, weakness, fever, and headache.

Fever has been continuous since then, frequent chilly sensations, no hard chills. No sweating, no alternation of days. Slight dry cough, no pain in chest.

Headache severe, insomnia troublesome, but patient feels dull and heavy, hearing considerably impaired.

Anorexia absolute. No vomiting since over a week ago. Bowels loose; only moved once on morning of admission.

Micturition infrequent. Urine dark.

For three weeks the patient was sustained through the progress of a typhoid fever of moderate intensity, when, during the night of August 2, eighteen days after admission, she complained of cramp-like pain over the cæcal region. One-half hour later, at seven o'clock, an ice-bag was applied, and pain disappeared for an hour, when it returned and was much sharper. At eight o'clock, leucocytes, 4600.

10 P.M. Abdomen was markedly retracted, tenderness over cæcal region only, no tympany in any part on percussion. Pulse of good quality.

12 M. Pain severe. Bowels moved without relieving it. Morphine, one-tenth grain, hypodermically, relieved pain somewhat.

August 3, 2 A.M. Patient asleep, but groaned in sleep. 4 A.M. Temperature fell to 97° F. Pulse still good in quality. Pain less. Abdomen somewhat less retracted, beginning to be a little rigid in right lower quadrant, extending up right side. Patient vomited albumen water.

8 A.M. Pain is more general. Abdomen slightly distended,

tender over a large area, rigidity more marked and spreading towards left side. Liver percussed to seventh space.

10 A.M. Patient vomited again albumen water and bile-stained fluid. Abdomen rigid over all, slightly distended, very tender, more so on right side. Pulse 128, of poorer quality. Leucocytes, 6500.

I was then requested by Dr. Thacher to see the patient, and advised immediate operation for the existing peritonitis, due probably to perforation.

The abdomen was opened at 3.30 P.M., of August 3, twenty-one hours after the onset of the symptoms of perforation, under chloroform narcosis, by a median incision below the umbilicus four inches long. A large amount of yellow fluid largely composed of milk with foul odor gushed out. A three-inch intermuscular incision was then made on right side. Appendix found congested, but apparently due to external causes. A small circular perforation in ileum found and closed with Lembert sutures of silk. Small gut then examined further and two other perforations found and closed in same way. The first was minute, but the second was about one-half an inch in diameter and surrounded by yellow membrane, evidently the main channel of the intestinal content escape and cause of the general peritonitis. The peritoneal cavity was thoroughly irrigated through the two wounds. A tube was inserted through the posterior vaginal fornix into peritoneal cavity and wrapped with gauze. Parietal wounds were then closed in layers without drainage. Time, thirty-five minutes. Condition poor, becoming critical.

Patient was freely stimulated during night. Perspired freely all the time. Abdomen became gradually more distended and tympanitic, and she died twenty-eight hours after operation. So much thick yellow discharge mixed with light yellow fæcal matter flowed from the vaginal drainage tube as to have suggested that another perforation had occurred. Temperature at death, 107.5° F. Leucocytes, 11,000.

CASE II.—A man, forty years of age, was admitted to the Presbyterian Hospital, July 17, 1902. Two weeks previously, after drinking freely of beer, he felt badly, with vomiting and gastric distress. The following day he went to work, still feeling weak and apathetic. The next day he got very drunk on whiskey and had marked symptoms the next day. There was some head-

ache. An occasional epistaxis occurred during the succeeding ten days. Bowels somewhat constipated. He took "magnesia" every day with some slight movement as a result. Pain in the back was troublesome and headache severe. He kept at work right along, however. On the day of admission, while at work in a strained position with arms above his head, he had a sudden sharp pain in lower right quadrant of abdomen of a most severe character; it "doubled him up," but he reached home. Pain was so severe that he rolled about the floor; this gradually diminished, but tenderness increased until the parts could not stand the slightest pressure. When admitted seven hours after onset there was almost no pain, no vomiting, but tenderness extreme. Bowels had not moved since previous day. Temperature had risen to 105.8° F. He was well nourished, corpulent. Facies anxious and restless. Lips and tongue very tremulous, the latter heavily coated with a yellow fur and dry.

Abdomen was considerably distended and rigid over all, particularly in right iliac fossa for four inches below the level of the umbilicus. Here there was exquisite tenderness, elicited on slightest touch. Percussion note over an area of four inches in diameter from level of umbilicus dull. No friction notes heard. No definite mass made out. Leucocytes, 6000.

One hour after admission and nine hours after onset of symptoms of perforation, under ether, a three-inch incision—the centre being at McBurney's point—was made and deepened by intermuscular cleavage to the peritoneum, which was œdematous, and on opening about two ounces of turbid serum squirted out. Retracting towards median line, the congested ileum presented, more or less covered with fibrin. In its centre was a linear rent, one-half inch long. This was closed by a double layer of Lembert sutures. This lesion was about five inches from the ileo-cæcal junction and on the upper surface midway between the mesenteric and free border.

Examination of ten inches of the ileum proximal to the lesion showed several areas of central thinning with indurated margins and of lighter color than the parts surrounding them. The mesenteric attachment over the whole extent of gut examined was thickened, and at certain places, particularly opposite the perforation and the other several areas alluded to as probably

ulcerated Peyer's patches, this glandular enlargement was most marked and associated with a purplish color.

All evidence pointed to a localized peritonitis in the vicinity of the bowel first exposed, and search for additional perforations beyond the distance mentioned seemed not advisable. Two small cigarette drains were placed in contact with the centre of infection and the wound was slightly closed at extremities. Time of operation, forty minutes.

July 18. Patient in good condition. Facies placid, restlessness greatly diminished. Heart's action of better force; sounds of better quality. Respiration still rapid. No signs in lungs. Abdomen again distended, but no pain. Good movement, dark greenish, in response to enema. During the night tympanites was relieved by rectal tube. Temperature this morning, eight o'clock, 102° F.

July 19. Temperature continued 102° to 103° F.; pulse, 120 to 124; respiration, 26 to 34. Heart and lung action improving. Abdomen still distended, but always relieved by rectal tube insertion. No abdominal pain, no vomiting. Good result from enema. Patient quieted by cold packs, but temperature not much affected. Wound dressed. Had been a slight serosanguinous discharge. No pus or fæces. One cigarette drain removed.

July 20. Condition about the same. A systolic murmur heard over pulmonary aortic valves. Patient vomited beef-tea this morning. Good result from enema. No signs of hæmorrhage. Fluids taken fairly well. Leucocytes, 13,900; no Widal reaction. Meteorism continues.

July 21. Temperature continues 102° to 103.5° F.; pulse, 124; respiration, 30 to 40. No vomiting. Meteorism continues, but amenable to rectal tube. Wound dressed; discharge still slight; little pus along sides of drain. Iodoform gauze still left undisturbed.

July 22. Patient vomiting more. This morning the pulse is perceptibly softer, weaker, and smaller. Heart sounds of fair quality. Abdominal distention about the same as on previous days; no blood in stools. Temperature, 102° F.; pulse, 126; leucocytes, 6500. Widal negative.

July 23. Widal suggestive. This morning, during delirium, patient fell from his bed. Shortly afterwards pulse was very weak. Hypodermoclysis failed to improve it. Infusion was then

given with no appreciable reaction, and he died six hours after the fall. Necropsy was not permitted. Cultures made at time of operation gave rich growth of colon bacillus.

CASE III.—A woman, twenty-three years of age, was admitted to the Presbyterian Hospital, August 15, 1902, in the medical service of Dr. Tuttle. For more than two weeks she had had headaches and anorexia; otherwise felt well. One week ago she began to feel feverish. Had epistaxis, and this has been repeated two or three times a day ever since. Patient went to bed five days ago, much prostrated. No alternation of days.

The fever and prostration have grown steadily worse; has perspired freely. No chills. Anorexia complete; at times nauseated; has not vomited.

Bowels were regular up to five days ago, when they began to be loose. Four or five yellow-brown movements; no blood.

For past three days has had cramp-like abdominal pain across lower half of abdomen. Head has ached constantly; also back and knees. Felt very dizzy on attempting to get up. Has slept poorly; felt restless, but very heavy and languid.

Her abdomen was a little rigid. Slightly tender to deep pressure on right side. On the trunk and the abdomen were a few erythematous spots, not typically enteric.

On admission, temperature was 103.5° F.; pulse, 120; respiration, 24. Leucocytes, 9200. Widal negative. Seven days later Widal positive. During this week pretty continuous temperature, between 103.5° and 104.5° F., despite tub-baths averaging one every two hours. On eighth day after admission had hæmorrhage, four ounces. Baths discontinued and temperature ranged lower. Five days later another hæmorrhage. During next nine days there were ten hæmorrhages. Degree of pyrexia constantly declining, ranging between 99.5° and 103° F.

On September 6, three weeks after admission, at 4.30 P.M., she had an onset of severe pain in the lower right side of her abdomen, causing her to roll about. Pulse increased to 132 and temperature began to rise, and at 5.30 there was a distinct chill, and cyanosis noted in nails and lips. Pain continued intense and had extended across the lower abdomen. There were no rigidity, no tympany, no loss of liver-dulness, but distinct dulness over the entire lower abdomen, and excessive degree of firm retraction. Temperature continued to rise, and at 8 P.M. had reached

104.4° F.; pulse, 138. Patient had received three minims of Magendie solution and was much quieter, pain having almost disappeared. Marked tenderness, however, persisted over the infra-umbilical portion of the abdomen. Rigidity began to appear, and there was a little tympany over cæcal region and dulness on the left side in a corresponding position. At nine o'clock pulse was 130; leucocytes, 3600. Temperature had dropped to 103.8° F. About this time the writer saw the patient with Dr. Tuttle, and advised immediate operation for repair of a presumed perforation. Hypodermoclysis of 400 cubic centimetres salt solution was given.

At 11.30 P.M., seven hours after first signs of perforation, under ether, mainly because of marked tenderness and most dulness being noted in the left hypogastrium, a median incision of four inches was made. The bleeding was unusually free. On opening the peritoneum the omentum was found well down in the left flank. This was carefully drawn up and with two fingers placed under a loop of injected ileum both gut and attached portion of omentum were lifted out of the wound. While so held, without the slightest appreciable traction on either, they fell apart, disclosing a finger-nail-sized ulceration, but over which still spread some of the serous coat of the bowel. An oval slit or punctate spot in this attenuated membrane was blood-stained and represented the perforation. The yellowish-gray impression imparted to the omental surface was of the exact marginal size and round shape of the entire intestinal lesion, just as if there had been no partial intervening portion of visceral peritoneum.

There was a little free, slightly turbid fluid in the peritoneal cavity, and a few small flakes of fibrin attached lightly to near-by parts of the ileum. No blood. No fæces. The lesion was closed by a double row of interrupted silk Lembert sutures, and Cargile membrane adjusted over and beyond the site of the suture. The gut was then examined for about twelve inches above and below this lesion. Nearer the cæcum the omentum was found attached to the gut over a space twice the extent of the lesion already dealt with. This was so firm as to give the impression that Nature had here utilized the omentum so efficiently in anticipation of a perforation that to sever it and substitute suturing was uncalled for, if not unjustifiable. In the opposite direction another small ulcer was met which seemed to be fairly close upon the serous

surface. This was reinforced with a layer of Cargile membrane. The peritoneum was closed with catgut, and the individual parietal layers with interrupted chromic gut. No drainage. Time, thirty-five minutes.

During the night at intervals patient vomited greenish fluid. Next morning, temperature was 100.5° F.; pulse, 130, of good quality. Abdomen soft; a little retracted. Feels fairly comfortable and in good spirits. Leucocytes, 6200. From now on until convalescence was established, twenty-six days later, there was a persistently lower temperature and better pulse-rate than on any single day previous to the operation. No blood was subsequently seen in the stools. Leucocytes varied between 3600 and 5000.

Three weeks after operation large quantities of pus appeared in the urine, and much more albumen than the pus would ordinarily account for, but casts were not found. Patient was discharged cured on the fortieth day after operation and sixty-three days (nine weeks) from onset of disease.

Cultures made at operation gave pure growth of colon bacillus.

NOTE ON THE FREQUENT GREAT DISPARITY BETWEEN FALLS UPON THE BUTTOCKS AND THE SUBSEQUENT PERSISTENT PAIN AND IRREMEDIABLE HELPLESSNESS IN PERSONS IN ADVANCED YEARS.[1]

BY OSCAR H. ALLIS, M.D.,

OF PHILADELPHIA,

Surgeon to the Presbyterian Hospital.

It is well known among the members of the medical profession that very trifling injuries are sufficient to produce fracture of the neck of the femur, and it is quite as well known that the results of these simple injuries vary greatly,—that in one case a good and useful limb will be obtained, while in another total helplessness will result. The fact that in one case satisfactory results follow treatment and in another under similar treatment pain and total helplessness, leads patients and their friends to reflect upon the skill of the respective surgeons, and has led many a surgeon to have confidence in a line of treatment that greater experience would show to be premature and ill founded. In the following remarks I shall not dwell upon the subjects of diagnosis and treatment, but will confine myself to the topic under consideration, and offer a few reasons for the pain and helplessness, and suggest a remedy for it.

I will first give brief histories of cases that have been victims of pain and helplessness until relieved by death; second, report similar cases that have recovered with useful limbs; third, will give the pathology of a few cases that I have posted or operated upon, and conclude with surgical procedures for its relief.

Case I.—Mrs. W. H., widow, seventy-nine years of age, active and in apparent good health, arose from her bed at mid-

[1] Read before the Philadelphia Academy of Surgery, October, 1902.

night, tripped in her night-dress and fell to the floor. The immediate pain and helplessness were the occasion of my summons. I found her with shortening, eversion, relaxed fascia lata, and excessive pain and helplessness. These being the signs and symptoms of fracture of the neck, she was immediately made as comfortable as possible, and, to prevent the formation of bed-sores, her position was changed, her bed kept as free from pollution as a dribbling bladder would permit. Efforts to move her were attended with pain, and when it was deemed proper to get her out of bed and sit her up, the pain was greatly increased. She lived four years, and was a helpless sufferer during the entire period.

CASE II.—Mrs. G., sixty-five years of age, was growing feeble from paralysis agitans, but otherwise not a sufferer. While sitting in a low rocking-chair she slipped to the floor; the fall was accompanied with so much immediate pain and helplessness that I was summoned. All the signs of fracture of the neck of the femur were present. The pain from the time of the original injury to her death, which occurred six years afterwards, necessitated day and night watches to turn and relieve her position.

CASE III.—Miss B., aged sixty-six years, arose from her bed and through some entanglement was pitched forward upon her hands and knees. She said that if her thigh had been made of glass, it would have broken, as she thinks her thigh was broken. All the symptoms of fracture of the neck of the femur were present. She was gently moved about in bed and no bed-sores resulted. It is now six years since the injury. She can barely stand alone, and is practically helpless, though in comparatively good health.

In none of these cases was there any attempt at treatment. The effort on my part being to avoid bed-sores and to make the patients as comfortable as possible. To show that the bad results were not due to faulty treatment upon my part, I will give three cases as nearly parallel as possible.

CASE IV.—Miss R., aged sixty-three years, fell in the yard; as it was in winter, the pavement might have been slippery. I saw the case with Dr. Franklin Mathews a few days later. He had diagnosticated fracture of the neck of the femur, but had

not made a thorough examination, deferring it, if necessary, until I came. All the signs were so clear that no further examination was made. She had received no treatment save that of making her comfortable in bed. After my examination, she said, "I do not know why you advise my staying in bed. I am as well as ever except this bruise." She was not told her hip was broken. She was helped out of bed the second week, and in due time walked with crutches, then without them, going to visit friends and to church. An autopsy several years later confirmed the diagnosis.

CASE V.—Clergyman, aged seventy-eight years, was knocked down by a passing carriage; was rendered helpless and brought home in conveyance. Fracture, neck of femur. Was gotten out of bed second week. Soon moved about on crutches, and later went into the pulpit, with a number of steps to ascend, and preached an old-fashioned—which means a long—sermon. He was indeed proud of his achievements upon his broken thigh.

CASE VI.—Mrs. G., widow. Though suffering from paralysis agitans, she was able to go about. Was struck by a wagon and knocked down. Every sign of fracture of the neck of the femur present. Confinement for a few days revealed a forming pressure sore and special treatment abandoned. She was made comfortable. No particular attention was paid to her fractured thigh. Gotten on to her side and propped with pillows to relieve pressure on her buttocks. Later out of bed. She recovered, and had a useful joint, going up and down stairs and all about her house without the use of crutch or cane.

As the only treatment in these cases was to make the patients comfortable, and to avoid pressure sores by changing their position in bed several times a day, some might infer that had extension been made or long splints been used the results would have been better; but I have been careful to give an equal number of the two classes,—the first of great and permanent sufferers, and the second with but little pain and recovery with useful limbs.

To make my point more emphatic, I add the history of a case treated by Dr. Walter C. Stillwell.

CASE VII.—Mrs. C., aged sixty-seven years, fell in the yard; was treated with extension and lateral supports for eight weeks, during which time there was no pain. She was then permitted to get up, when the pain commenced, and continued until she died six years later, during all of which time she had been obliged to sit in a chair night and day. The injured limb swelled greatly, and the distention, no doubt, caused much of the pain.

The different results from trifling injuries—for such falls as I have described are comparatively trifling—must be due to very different conditions present. These may be considered under the following heads:

First. Osteophytes may spring up about the injured joint, or fragments of bone from the original injury may become fixed like stalactites and pierce the tissues. Such a condition I found present at the autopsy in Case I.

Second. The fall may in one instance produce concussion of the joint. In experimental work, I have found that when great pressure has been exerted against an articulation, in some instances the cartilage has been depressed, cracked, and distinctly broken. Although in fractures of the femoral neck the yielding of the bone under comparatively slight injury would preclude a concussion or severe injury to the joint, yet in autopsies, after years of suffering, I have found evidence of a mild subacute arthritis that accounted fully for the pain. In one instance in which I was permitted to operate five years after a fracture of the femoral neck, I found no evidence of active degeneration of the articulation, but the head and socket both showed large areas of absorbed cartilage and denuded bone.

Third. The sciatic nerve may at times be pinched or torn. I know of no facts to warrant this statement. There are facts that show that this nerve is injured by dislocations. Autopsies show that blood has been effused into the sheath of this nerve, and the same has been lacerated and torn in two. It is also known that paralysis has followed either injury to the nerve from dislocation or from injury in attempts at replacement. In one case of a comparatively slight fall backward, the patient

experienced no great pain, and was able to get up and go into her kitchen. The pain arose while she was in a sitting position, and soon became so violent that she could not move the limb without pain. An examination under ether revealed no bone lesion, and the conjecture was that the sciatic had been bruised.

Fourth. The ligamentum teres may be torn. Of this I have no positive evidence. In one autopsy to examine a fractured hip it was either congenitally absent or absorbed. I have in experimental work torn the ligamentum teres without dislocating the head of the femur.

In regard to treatment, I have little to offer. In one case I removed the fragment of the head of the femur five and a half years after the injury because the patient had suffered pain night and day all these years and could endure it no longer. As the patient was sixty years old, with atheromatous arteries, the fact that no brilliant result followed may not be wholly attributed to the operation. The pain is much diminished, none at all at times, and locomotion gradually improving.

If an operation be undertaken, it is reasonable to think that it should be indicated by the persistency of pain,—after one or two months. There are few surgeons who would think of removing the fragments of a broken femoral head and neck without first seeing what effect treatment would bring about, but after one or two months of continuous pain, surgical interference is warranted, provided the patient's age and strength will permit.

HYGROMA AND FIBROMA OF THE TUBER ISCHII BURSÆ.

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In the Von Bruns-Mikulicz "Practical Surgery," Professor Hoffa, of Wurzburg, says on page 183, Chapter vii, under Diseases of the Bursæ of the Hip, after speaking of the inflammatory affections of the more common bursæ, "That there is little to be said of the rest of such bursæ involved, inasmuch as few such cases are known of or have been described. If one knows the exact anatomical location of the bursa, then it behooves us to relax the overlying muscles, to make fluctuation apparent, and to gain some idea of the surface and etiology, and, finally, make an exploratory puncture." Hygroma of the tuber ischii bursæ, according to König, occurs mainly in people who, through their vocation, are compelled to irritate the parts by sitting a great deal.

Dr. O. von Büngner, assistant to Von Volkmann in the Surgical Clinic at Halle, describes a case under the title of "Ueber ein enormes, mit grossen Fortsatzen versehenes Hygrom des Scheimbeutels auf dem Tuber ossis ischii" in the *Berliner klinische Wochenschrift,* in which he states that, although disease of the bursæ of the hip and gluteal region, namely, the subiliac and trochanteric, are occasionally brought to the notice of every busy surgeon, the hygroma of the tuber ischii is of the greatest rarity. In the surgical works it is seldom alluded to. Roser, in his "Handbook of Surgical Anatomy," says, "The bursæ over the tuber ischii may be developed into large tumors or abscesses, and he later states that this form of hygroma may be occasioned by vocations compelling a continued irritation of the nates in sitting. They lie so deeply that one is apt to mistake them for solid instead of fluctuating masses. Von Bünger also states that he has only

found allusion to such an affection in Von Volkmann's Krankheiten der Bewegungs organe, and in W. Heineke's monograph, "The Anatomy and Pathology of Bursæ and Tendon Sheaths."

Volkmann cites Cloquet, who saw such a bursa distended to the size of an adult head, and Heineke cites Velpeau, who found a sanguinolent fluid in such a sac. Outside of these cases he found none in the literature, except one case of Dupont's, which was inaccessible to him. The author states, Wherein lies the great rarity of this affection? To answer the question, he endeavored to find the frequency of the normal development of this particular bursa, and consequently consulted Volkmann, Professor Wenzel Gruber, of St. Petersburg, and Heineke, the foremost authorities on this subject, who came to the conclusion that the bursæ of tuber ischii is inconstant, and only found in a very few cases; and not alone this, but being protected from injuries by the soft parts, are much less liable to this transformation than other bursæ in the neighborhood.

Ziegler, in his "Special and General Pathology," on p. 263, says, "The bursæ, which are generally developed in connective tissue, are structures made up of a connective-tissue capsule, whose inner surface is generally smooth and contains a clear synovial fluid. They are found generally where muscles or tendons run over bony prominences, or where the skin, fascia, and muscles are continually subject to pressure or displacement. They are consequently acquired structures, and hence some are inconstant." In the acute inflammations of the bursæ, called acute bursitis or acute hygroma, we find the contents according to the form of inflammation serous, or serofibrinous and pus, which dilate the sac, so as to give rise to a fluctuating tumor. The inflammation arises most frequently from contusions, wounds, and pressure, and is seldom due to infection from the blood. Purulent inflammation may invade the surrounding parts.

The chronic form manifests itself generally by an accumulation of fluid in the bursal sac. At first the fluid is of a

mucoid character, stringy, and later it becomes thinner and loses these characteristics.

The majority of hygromata reach the size of a fair-sized apple, although they may exceed this; the most frequently involved being the prepatellar bursa. In case of a communication of the bursa with a joint, we also find an excess of fluid in the joint.

The sac of the hygroma is generally thin, but from continued irritation may become immensely hypertrophied and in part calcified. In cases of gout we may have deposits of uric acid, and occasionally we may have from the start a hypertrophy of the sac with a very small quantity of fluid. We may also find present in the sac corpuscula oryzoidea, or rice bodies, as are found in the ganglion of tendon sheaths, which consist of layers of homogeneous masses and spindle-cells formed by a coagulation process and interspersed with cells, which become organized to a certain extent according to Volkmann, and occasionally connected with the wall of such hygromata are found papillomatous excrescences, whose pedicle is made up of a delicate thread of connective tissue, holding in suspension such a rice body, which may become separated and form a free body. Upon pressure in such a ganglion filled with a number of such bodies, we get a peculiar sensation of crepitus, hence they are known as ganglion crepitans.

In rare cases developed from the wall of hygroma we get cartilaginous bodies, which resemble the so-called foreign bodies of joints, when they become free. Their size varies from that of a pea to a chestnut.

In cases of hygroma we may also have hæmorrhages due to trauma or circulatory disturbances, in which there is more or less of a fibrinous deposit; these are known as bursæ hæmatoma. Tubercular inflammation of bursæ may occur secondary as well as primary. The development of tubercles in the wall of the bursal sac may be accompanied with a serous exudation, and this form is known as hygroma tuberculosum. In the further development of this form, the inner surface of the sac may become the seat of fungous granulations, while the sac

wall in general is thickened and interspersed with tubercular foci of granulation tissue, which later may undergo cheesy degeneration. A. Müller, in his Inaugural Dissertation entitled "Ueber Bursitis ischiadica," states that up to 1895 only six cases of the kind had been reported, the first cases by French surgeons. Other works on this subject, such as that of A. Manz, "Beitrage zur entstehung der Reis Koerperchen mit besinderer, Berüchsichtiguing der schleimbeutel hygrome," P. Mannersburg, "Schleimbeutel Hygrome in der Beckengegund," were inaccessible to me.

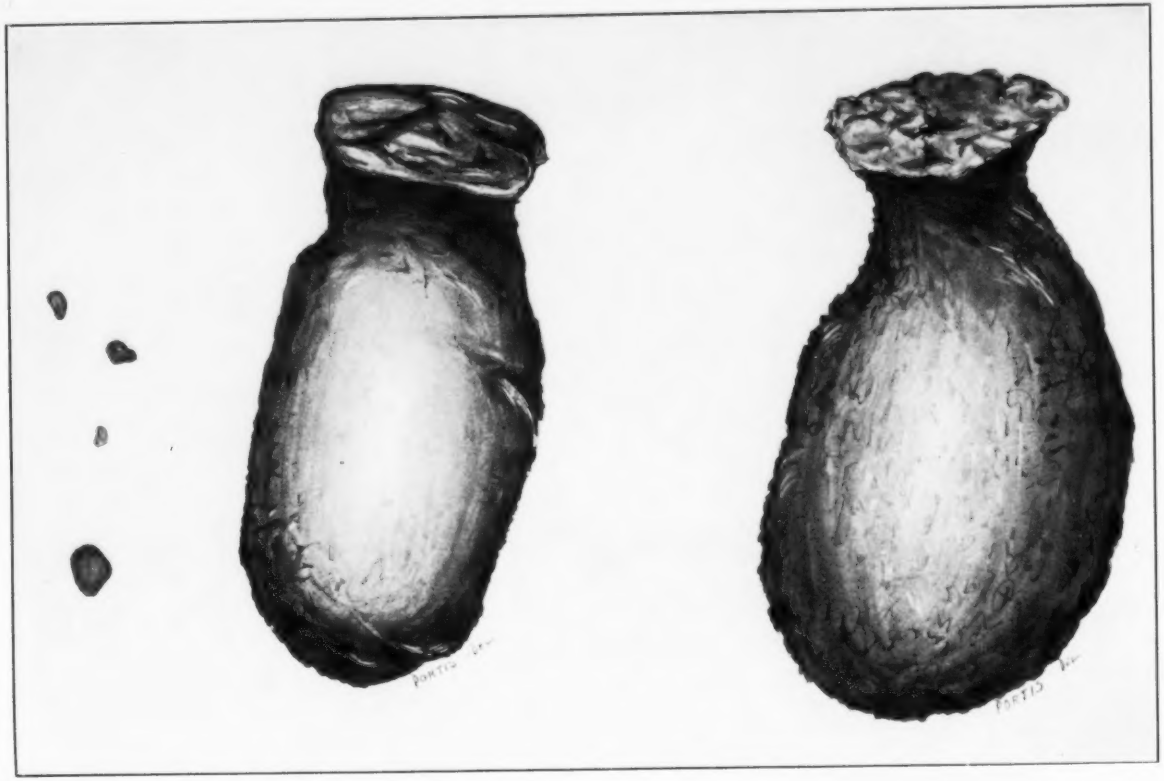
E. Kuster, "Hygroma bursæ tuberis ischii," *Med. Chir. Centralblatt*, Wein, 1882, xvii, 532, gives the history of two cases operated upon by himself, in which the etiology of the second one corresponds to a certain extent to that of my own, inasmuch as the patient, six weeks previously, had received a severe contusion of the gluteal region while in the saddle, riding a mule.

It is due to the fact that so few such cases have been recorded that I report the following cases. I am inclined to think that these are the first cases to be reported in America.

H. W., aged fifty years; occupation, butcher; nationality, English, presented himself at my surgical clinic at Rush Medical College, Out Department, early in April. He was sent to the Michael Reese Hospital, where on April 24 I operated upon him.

His history reads as follows: For the past fifteen years he has had several hard, indurated nodules on both buttocks, varying in size from that of a marble to that of a walnut. These masses never caused him any inconvenience until quite recently. For twenty years he had been in the saddle more or less, being a ranchman on the plains in the West. A short time ago he endured severe hardships, being compelled to walk long distances, and since then he has experienced pain and distress when he moves his limbs and while sitting. No other nodules are to be found elsewhere on the body, no constitutional symptoms. Both limbs were slightly swollen a few weeks ago, but at present no œdema is noticeable.

In the gluteal region on both sides, almost directly overlying



Rice bodies.

FIG. 1.
Gross specimens.

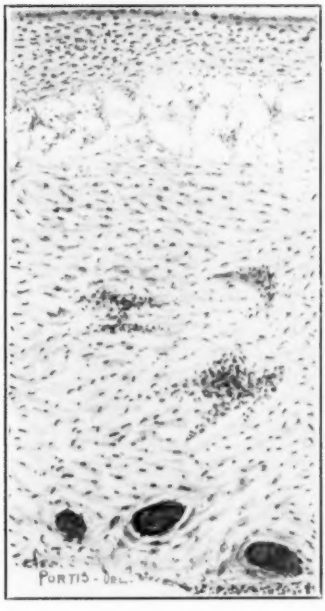


FIG. 2.—Low power. *a*, external layer; *b*, middle layer; *c*, internal layer.

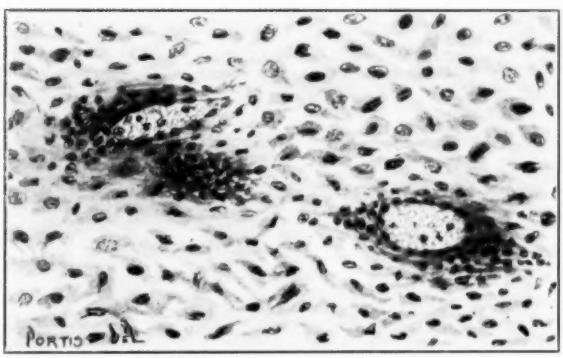


FIG. 3.—High power. Internal layer.

and to either side of the tuber ischii, are found prominent masses of several very hard, almost cartilaginous-like nodules, irregular, giving a grating sensation on the right side, while the left in parts gave the sensation of fluctuation, and both appeared to come from a deep, long attachment and be adherent to the skin. They were removed without much difficulty, and found to be firmly adherent to the tuber ischii. (Fig. 1.) During the operation, by too strong tension of the vulsellum forceps, both sacs were ruptured slightly, permitting of an escape from the right one of a half-teacupful of rice bodies, from the left one a serous, dark, bloody fluid.

The greatly dilated and hypertrophied connective-tissue capsule in both specimens are traversed by connective-tissue bundles, such as we find in true fibroma. The right one contained no less than a teaspoonful of rice bodies, while, as previously stated, the left contained an equal amount of serous, bloody fluid. Cross sections of each bursal sac were taken, hardened in alcohol, mounted in celloidin, and stained firstly in lithian carmine and, later, with Weigert's fibrin stain.

The sections showed the following microscopic picture: Three layers were to be distinguished, and the general characteristics of each correspond closely to the sections of both Müller and O. Büngner. First (Fig. 2, *a*), the external layer is composed of dense connective tissue which contains numerous round cells interspersed between some of the connective-tissue fibres, and has markedly compressed the far tissue beneath. Small vessels are occasionally found in this layer, but mainly devoid of contents, although surrounding the same we find evidence of former extravasation from the vessels in the form of pigment.

Middle layer (Fig. 2, *b*) is composed mainly of a round-cell infiltration, interspersed between looser connective-tissue bundles and far tissue, stained more or less with blood pigment.

Internal layer (Fig. 2, *c*, and Fig. 3) is composed of connective-tissue fibres, very rich in blood-vessels, which are considerably distended with blood-corpuscles. These lie more superficial in this layer, and are surrounded by evidences of extravasation. The cells described by Müller in this layer as containing a small amount of protoplasm, with a long round or ovoid vesicle-like nucleus, are to my mind artefacts due to the teasing of the connective-tissue fibres asunder.

This layer also contains isolated in the neighborhood of the blood-vessels a considerable number of red and white blood-corpuscles, with blood pigment between the vessels. This is shown nicely in the accompanying drawings of the microscope sections. Although the surface of this layer does not show an endothelial layer or lining, yet in numerous places one finds areas which correspond to fibrinous deposit from recent hæmorrhage, and these undergoing an attempt at organization, as shown by the connective-tissue bands which lead to the underlying parts. These areas are shown in the slide as having taken the aniline gentian violet stain more deeply, and have become less decolorized than the surrounding tissue.

Interspersed in this tissue we find emigrated leucocytes.

The whole is a perfect picture of hæmorrhagic inflammation.

The hæmorrhagic contents found contained in one sac is composed of blood- and pus-corpuscles. Microscopic examination of a number of the rice bodies showed lamellated layers of organized fibrin, although absolutely no indication of the miliary tubercle or tubercular tissue in general, and no tubercle bacilli, for which a number of specimens were stained.

In conclusion, I wish to say that about two years ago a middle-aged man presented himself at my surgical clinic in the Michael Reese Hospital, who presented a very similar condition. I operated upon him, and found an arborescent form of fibroma present, which probably arose from the bursæ, but the bursæ were more or less obliterated, leaving no apparent vestige of its former self, but instead a branched form of fibroma, whose main trunk came from directly over the tuber ischii.

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BLANK-CARTRIDGE WOUND INFECTED WITH TETANUS BACILLI; PROMPT EXCISION; NO TETANUS.

FROM THE CLINICO-PATHOLOGICAL LABORATORY, MASSACHUSETTS GENERAL HOSPITAL.

BY JOHN BAXTER BAIN, M.D.,
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THE object of reporting this case is to show the value of early operation in wounds infected with tetanus bacilli.

The patient was a girl, aged thirteen years, who, while playing with an older sister, was accidentally shot in the palm of the right hand with a blank cartridge on July 3, 1902.

Immediately after receiving the injury, the patient's mother washed out the wound with warm water and sent her to the Accident Room of the Massachusetts General Hospital, in the service of Dr. Samuel J. Mixter. On her arrival, examination showed a punctured wound in the palm of the right hand near the ulnar border, about the size of a ten-cent piece, blackened at its edges, and surrounded by an area of powder-stained tissue. The wound was cleaned with soap and water, chlorinated soda (1 to 15), and corrosive sublimate (1 to 1500), and the following operation was performed about fifty-five minutes after the injury by Dr. Beth Vincent, an interne in the hospital.

A tourniquet was applied to the forearm, and an elliptical incision was made about the wound of such extent as to include the powder-stained area with a margin of normal tissue. Powder grains were found embedded in the muscles, tendon sheaths, and nerves. All such tissue was carefully resected, the dissection being carried down between the third and fourth metacarpal bones as far as the fourth dorsal interosseous muscle. The wound was then douched out with corrosive sublimate, 1 to 5000, a wick was inserted, and its edges were partially approximated with silkworm-gut sutures. It was drained for twenty-four hours, and at the end of this time the wick was removed. Under the ordinary

antiseptic precautions, the wound healed with great rapidity, and the patient was discharged well in a month.

The patient was seen on September 26, 1902, and found to be perfectly well, never having had any symptoms of tetanus. The wound was healed, leaving a small linear scar about three centimetres in length.

All the tissue removed at the operation, together with the particles of wadding and powder grains found in the wound, were placed in a culture tube of coagulated blood serum and sent to the Laboratory to be examined for tetanus bacilli. After three days in the incubator, a considerable growth of bacteria had occurred in the tube, examination of which showed numerous micrococci and bacilli. Some of the bacilli had spherical spores situated at one end, and were identical with tetanus bacilli in appearance. These were isolated in pure culture by means of anaërobic plate cultures and were found to be true tetanus bacilli. They presented the following characteristics:

Colonies twenty-four hours old in glucose agar, under lower power of the microscope, were seen to consist of interlacing filaments with a somewhat granular centre, the filaments extending out into the surrounding medium in a more or less radiate manner.

Stab cultures in glucose agar from these colonies showed a grayish white streak along the line of inoculation at the end of twenty-four hours, which grew to within a few millimetres of the surface of the medium. A diffuse lateral outgrowth gradually took place from this grayish white streak, so that at the end of two or three days the medium had a hazy appearance. A small amount of gas developed, and the culture gave rise to a peculiar foul odor.

In tube cultures under anaërobic conditions by Wright's method (*Centralblatt für Bakteriologie*, Parasitenkunde und Infektionskrankheiten, I. Abtheilung, Band xxix, No. 2, 1901), the bacillus showed the following characteristics:

Surface of coagulated blood serum: Very feeble growth without liquefaction of the medium.

Litmus milk: Feeble growth without visible change in the medium.

Bouillon, reaction + 1.0: Diffuse cloudiness after twenty-four hours in the incubator. Later, a viscid, grayish sediment collected at the bottom of the tube. No surface pedicle.

The bacillus produced spherical spores, situated at one end and was like the tetanus bacillus in morphology. It stained by Gram's method.

Inoculation experiments with animals gave the following results:

Two mice, inoculated subcutaneously, after twelve or fifteen hours developed paralysis of one hind leg, which was soon followed by a similar condition in the other. With both legs paralyzed and lying extended, they would attempt to go about dragging them, which is so characteristic of experimental tetanus in mice. This condition was followed by opisthotonus, convulsions, and death in from twenty-four to thirty-six hours. Two guinea-pigs died in from thirty-six to forty-eight hours, after subcutaneous inoculation, with all the signs characteristic of tetanus in these animals.

In brief, the organism isolated in this case presents all the morphological, cultural, and pathogenic properties which are characteristic of the tetanus bacillus, and with which we have become familiar by the study of tetanus bacilli isolated by us from undoubted cases of human tetanus.

To the best of our knowledge, this is the first case in which tetanus bacilli have been isolated from a wound without the occurrence of symptoms of tetanus in the patient.

In the course of the last six years, material from at least forty-six blank-cartridge or similar wounds has been examined for tetanus bacilli in this Laboratory, and in none of these was the organism found unless tetanus was present.

It is, therefore, highly probable that, if it had not been for the prompt cleansing and excision of the wound in this case, symptoms and signs of tetanus would have developed in the patient. The interval which elapsed between the accident and the operation was probably so short that there was not sufficient time for the organism to develop or elaborate any tetanus toxin.

This case should furnish a strong argument in favor of the early and complete excision of all wounds which from clinical experience are likely to be followed by tetanus, especially those arising from blank cartridges.

DISLOCATION OF INDIVIDUAL CARPAL BONES, WITH REPORT OF A CASE OF LUXATION OF THE SCAPHOID AND SEMILUNAR.[1]

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It is the purpose of this paper to direct attention to a form of dislocation hitherto considered to be rare, and mentioned briefly, if at all, in most treatises on surgery. Rare indeed, but probably often mistaken for something else, namely, Colles's fracture of the radius. The matter is worthy of consideration, because these dislocations have been and will be mistaken and treated as sprains and fracture. It is important to recognize the condition early, for there is a chance then, if ever, of making reposition. Older cases associated with disablement of the hand, and the sequelæ of nerve pressure, may be greatly improved by operation. I will not estimate how many cases there are to-day nursing an old alleged "fracture of the radius," with "poor union," or "callus formation," with a more or less stiff wrist and powerless grasp of the hand. By means of the Röntgen ray, and by operation, a number of these obscure "fractures" have been cleared up and correctly diagnosed.

Dennis' "System of Surgery" and Wyeth's "Text-book" make no mention of the subject.

"Isolated dislocation of every one of the bones of the carpus, except the cuneiform, has been reported. The semilunar is the one most frequently dislocated, the injury having been compound in half the cases reported, and the displacement forward in all but one." "American Text-book of Surgery."

"The os magnum is the only one of the carpal bones likely to be displaced. This bone is occasionally displaced backward, so that it is prominent on the dorsum. The bones of the

[1] Read before the Chicago Surgical Society, November 3, 1902.

carpus are closely bound together and are not often displaced, though a few cases of dislocation of the second row from the first are reported. This injury is usually an accompaniment of a crushing injury which breaks the bones and lacerates the soft tissues." Park's "Surgery by American Authors," Vol. i, p. 765.

"The scaphoid and semilunar have also been seen to be dislocated, usually in compound injuries." "International Text-book of Surgery," Vol. i, p. 632.

"We hardly ever observe dislocations of one carpal row on the other, but single bones of the carpus may be displaced, and form an abnormal projection on the dorsum of the hand." Helferich "On Fractures and Dislocations," Translation. Third Edition. London, 1899, p. 105.

"The carpal bones seldom become displaced except in gunshot wounds, or in connection with extensive lacerations and fractures of the neighboring parts. Simple dislocations, or rather subluxations, of these bones do, however, occasionally take place, but, so far as I have been able to ascertain, except in the case of the pisiform, only in one direction, namely, backward. The bones of the carpus, which are said occasionally to have suffered simple backward subluxation, are the semilunar, cuneiform, and pisiform of the first row, and the trapezium, magnum, and unciform of the second row. I have found no account of an example of simple dislocation of single carpal bones except in the cases of os magnum, pisiformis, and lunare, as above mentioned." Hamilton, "A Practical Treatise on Fractures and Dislocations," Eighth Edition, 1891, p. 661.

The above is practically all that is mentioned on this matter by the authors quoted, and, although all are of comparatively recent date, it will be obvious from the following that all, except the "American Text-book," admit of more or less revision.

Tillmanns [45] and König [20] contain a brief summary; but the "Handbuch der Praktischen Chirurgie," by von Bergmann, von Bruns, and von Mikulicz [46] contains a concise yet comprehensive *résumé* of the subject.

In Stimson's "Treatise on Dislocations," 1888, p. 367, is found a very complete article, with literary references to date of issue; it is the fullest description contained in any text-book.

The history of my case of simple complete anterior luxation of the scaphoid and semilunar bones is as follows:

C. F., aged twenty-five years, painter. History previous to accident negative; always healthy and well. June 12, 1902, while at work on a scaffolding, he lost his balance and fell a distance of four stories, his fall being interrupted by several obstructions before, with hands extended, he finally struck the ground. He was taken in an unconscious condition to the hospital, where it was found that, except as to his right arm, he was practically uninjured. The injury of the arm was diagnosed "fracture of the lower end of the radius," and the member was put up in splints.

In July, on my assuming the surgical service, I first saw the patient. It was then four weeks after the accident, the splint had been but recently removed, and the patient was still complaining of disability of the right wrist and hand.

On examination, the fingers are found to be held somewhat flexed (*en griffe*); he cannot pick up any object, neither can he make flexion nor extension of the fingers. On passive motion, however, the fingers can be extended and pretty fairly flexed, but the movements are painful. Pronation and supination are free, both active and passive. Active and passive motion at the wrist is very much restricted. The hand is practically useless to the patient, even as regards the simplest manipulations.

There is a bluish scar at the middle of flexure of wrist about two centimetres in extent; the dorsal surface of the wrist and forearm presents no abnormality. On the palmar surface of the wrist, and to ulnar side of the median line, is noticed an oblong swelling, about four by two centimetres, whose upper pole can be more readily outlined than the more deeply situated lower end.

The lower pole of the mass cannot be outlined definitely, owing to the superimposed flexor tendons. The upper extremity is rounded, extending about four centimetres above the level of styloid process of the ulna. The proximal (upper) extremity of the mass is slightly movable; the distal end is so deeply embedded that it is hard to say if any motion can be imparted to it or not.

FIG. 1.—Dislocation of scaphoid and semilunar bones, lateral view.

FIG. 2.—Dislocation of scaphoid and semilunar bones, anteroposterior view. Right hand.

In consistency it is hard and resistant; no fluctuation. Palpation of the ulna presented no abnormality, nor any evidence of previous fracture. The same was true of the radius as far as it was accessible to touch. No sensory disturbances of the fingers, but considerable atrophy of all the small muscles of the hand, and some atrophy of the forearm.

A skiagraph (Figs. 1 and 2) at once revealed the true nature of the trouble, and clearly showed that we had to do with the displacement of two bones, the scaphoid and semilunar, to a place far distant from their original location. To replace the bones by manipulation was obviously entirely impossible; they had become far displaced from their fellows in the carpus, and certainly at the expense of all ligamentous attachments; they were more or less fixed in their new location, and who could venture to replace them in their exact normal relations?

They were undoubtedly an impediment to motion, especially to flexion of the fingers and of the wrist, and could henceforth be regarded as foreign bodies, and their removal seemed clearly indicated.

A longitudinal incision two and one-half inches long was made midway between the tendon of the palmaris longus and the flexor carpi ulnaris. After dividing the fascia, the tendons of the flexor sublimis digitorum and the flexor profundus digitorum were drawn to the radial side by a blunt hook. The flexor carpi ulnaris together with the ulnar artery and nerve were retracted in opposite direction. The bones were easily accessible, lying on the pronator quadratus. The semilunar was more deeply situated and nearest to the wrist-joint; it was still partially attached by ligaments. The scaphoid was more superficial and was attached to its fellow by a few bands. Both bones were easily enucleated, after which the wound was closed by silkworm-gut sutures. Wound healed by primary union. There was no evidence of pressure on or stretching of nerves.

Subsequent History.—Although the condition of the wrist has improved considerably since removal of the bones, it is yet far from perfect. Formerly the hand was useless; now he is at work again, and able to use a brush, and grasp objects. He feels that the hand is becoming stronger and more useful week by week.

There is still considerable atrophy of the muscles of the hand, but the condition is improving. Active and passive motion at

the wrist is still very much restricted, due to the absence of the two carpal bones. This has improved slightly, but will of necessity never approach normal. This need not, however, materially interfere with his occupation. The hand can scarcely be extended above the horizontal, and flexion is also much restricted, the whole range of motion being about forty-five degrees. As at the time of operation no nerves were found involved by pressure or otherwise, it is probable that the persistent muscular atrophy of the hand is due to contusion of the nerves supplying these muscles.

By searching for and verifying all references in the literature, beginning with Seeger [1] (Schmidt's "Jahrbücher," 1834), I have been able to collect in all fifty-three cases, to which my own is added. This does not include the subluxations of the os magnum. There is only one case of complete dorsal dislocation of the os magnum on record, found in Cooper.[2] Cases of partial backward dislocation have been observed by Seeger, Cooper, Richerand,[3] Bonnes,[47] Chopart, Boyer, Chelius, Richter, and others. They are not rare, and are produced through hyperflexion of the hand (fall, or striking with clinched fist), or are the result of certain occupations, *e.g.*, weavers. Reduction is accomplished by making extension of the hand and pressing on the projecting head of the bone. It must be held in place, however, for the deformity easily recurs. No case of palmar dislocation has ever been reported, and it probably does not happen, for anatomic reasons.

The following is a tabulation of the cases reported, and the bones involved.

Semilunar. Total, twenty-three cases.

Simple dorsal dislocations. Erichsen.[4]

Simple palmar dislocations. Taaffe,[5] Chisholm,[6] Cameron,[7] Gamgee,[8] Berger,[9] Folet,[10] Eigenbrodt (four cases),[11] Stoffel.[12]

Compound palmar dislocations. Mougeot,[13] Holmes,[14] Hodges,[15] Gross and O'Hara,[16] Albertin,[17] Buchanan,[18] Körte,[19] König,[20] Bardenheuer,[21] Malgaigne (quoted by Albertin),[17] Berger.[9]

In seven of the simple luxations the bone was removed by

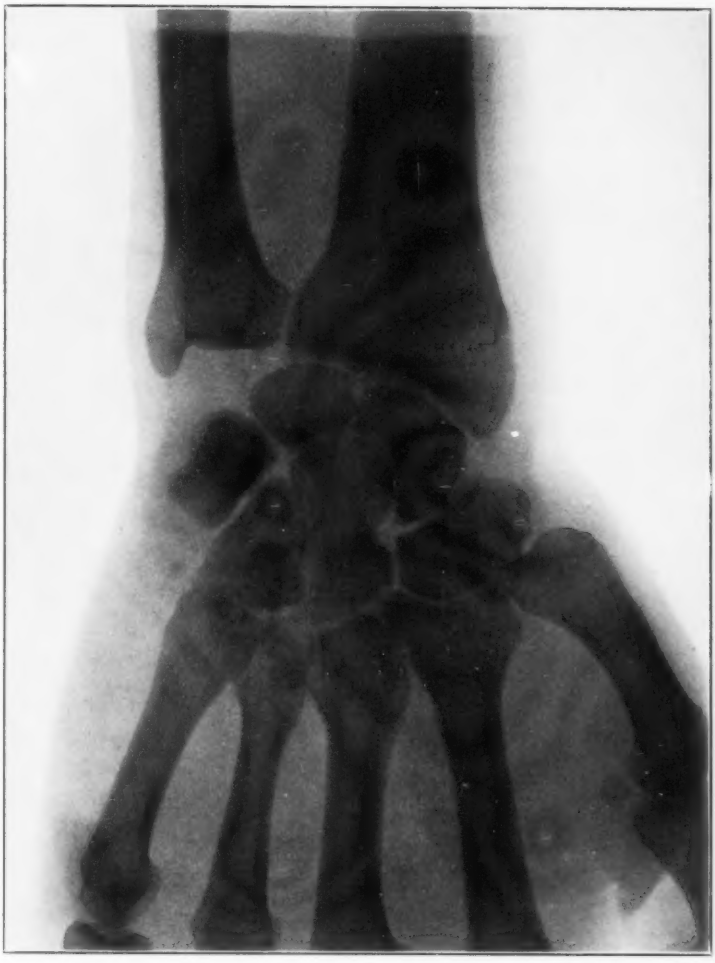

FIG. 3.—Normal wrist. Left hand of the patient, in whose right was the dislocation of carpal bones.

operation, viz., Chisholm, Gamgee, Cameron, Berger, Folet, Eigenbrodt (two cases).

Of the compound luxations, Holmes's case fell from a great height, and was instantly killed; both wrists were involved, and are preserved in the Museum of St. George's Hospital. Both wrist folds were torn widely open, and the semilunars are seen in the ragged wound, hanging by a few shreds of tissue. Hodges's case died of sepsis; Albertin's, of tetanus. Buchanan's was infected, the arm amputated, and the patient recovered. The displaced bone was removed in all of the remaining cases, and the patients recovered, sometimes with a good result.

Scaphoid. Total, seven cases.

Simple posterior dislocations. Smith,[22] Weber,[23] Stewart,[24] Elkington (quoted by Cooper).[2]

Compound posterior dislocations. Fagg (quoted by Tilmann).[48]

The cases of Nancrede[26] and Lembke[27] I cannot classify, as the original reports were not accessible to me.

Auvray[28] reported a case of fracture of the scaphoid, with dorsal dislocation of one of the fragments. No case of displacement to the palmar surface is reported.

Scaphoid and Semilunar. Total, five cases.

Compound anterior. Fayne,[29] Forgue.[30]

Simple anterior. Stoffel,[12] Potel,[31] Dubar (quoted by Potel).[31]

Dubar removed the bones by operation. In Stoffel's case the scaphoid was also fractured.

Pisiform. Total, five cases.

Erichsen,[4] Gras,[32] Barois,[33] Fergusson,[34] and Bieberbach[35] reported cases in which this bone was displaced upward; the usual cause assigned was excessive muscular action of the flexor carpi ulnaris.

Trapezium. Total, four cases.

Uhde,[36] Mosengeil,[37] Alquie,[38] and Bieberbach.[35]

All were simple dorsal dislocations, and were reduced by manipulation and pressure.

Trapezoid. Total, four cases.

Sheldon,[39] Gay,[40] Weber (two cases).[23]

The cases of Sheldon and Gay were simple dorsal luxations, caused by striking a blow with the fist. In neither case could the bone be completely reduced, nor was the usefulness of the wrist materially interfered with. Weber's two cases admit of some doubt as to the diagnosis.

Unciform. Total, three cases.

Buchanan:[41] a case of simple anterior displacement, reduced by pressure.

Eigenbrodt:[11] simple posterior displacement, complicated by fracture of the bone.

Oberst[42] (original article not accessible).

Scaphoid and Os Magnum.

Morris:[43] patient's hand caught in machinery; simple dorsal luxation; reduced; good function afterwards.

Trapezoid and Os Magnum.

Uhde:[36] simple posterior dislocation; could only be partially reduced; poor functional result.

Fracture of the radius occurred as a complication in five cases, viz., Elkington, Cameron, Buchanan, Gross and O'Hara, Berger.

Pressure on the ulnar nerve was observed by Berger (two cases), Folet, Eigenbrodt, and Dubar. There was tingling, numbness, or anæsthesia involving the little and part of the ring finger, and atrophy of the interossei and thenar and hypothenar eminences.

The median nerve was implicated in the cases of Cameron and Gamgee. There was atrophy of the ball of the thumb, and sensory disturbance of the palm of the hand and first three fingers. In all cases relief followed operation.

Etiology.—Hönigschmied[44] made some valuable experiments on the cadaver to explain the mechanism of wrist-joint injuries. Of nineteen cases where forcible hyperextension of the hand was made, a fracture of the lower end of the radius occurred in seventeen. In two there was no fracture, but only

a rupture of the anterior ligament of the wrist-joint, with anterior dislocation of the semilunar. In thirteen of the seventeen specimens of fracture, there was no other injury present but that named; in four there was either a fracture of carpal bones or styloid process, or more or less extensive rupture of ligaments.

Eight times a preliminary dissection of the wrist was made before subjecting it to forcible hyperextension. Five times the palmar capsule was lacerated; twice the scaphoid was partially dislocated, and in one instance the ligament between the two rows of carpals was torn. There was no fracture in these experiments.

Hyperflexion was tried twenty-five times (no previous dissection), with the following results:

Ten times: rupture dorsal carpometacarpal ligament.

Seven times: partial separation of dorsal capsule of radiocarpal joint and the ligamentum rhomboideum.

Six times: rupture of ligament between the two rows of bones.

Twice: partial dislocation of the head of os magnum.

Hönigschmied, as well as Nélaton, Bonnet, and Lecomte, was unable, by forcible hyperflexion, practised on the cadaver, to produce a fracture of the radius.

Albertin made a number of unsuccessful experiments in an effort to produce dislocations of the carpal bones.

Sheldon was equally unsuccessful in twelve experiments. In the normal movement of flexion and extension, there is more motion at the radiocarpal articulation than at the intercarpal. Braune and Fischer [49] have computed the ratio to be as 70:30. The practice of some trades (weavers) produces a loosening between the two rows of carpals. The dislocation of the head of os magnum is in fact looked upon by some as an incomplete intercarpal luxation. Complete intercarpal dislocation is very rare (Malgaigne, Maisoneuve).

The base of the os magnum is united by strong ligaments to the middle metacarpal bone. Its head articulates with a concavity formed by the scaphoid and semilunar bones, espe-

cially by the latter. If force be transmitted through the middle metacarpal and os magnum, the greater portion of it will be imparted to the semilunar. It has been said that the palmar ligaments of the semilunar are the weaker. Now, in cases of extreme hyperextension, where the palmar ligaments are torn, and force applied as above, the semilunar will be crowded out to the palmar surface of the wrist. In some cases the momentum has carried the bone an inch or two away.

Hyperflexion displaces the bones to the back of the wrist, especially the scaphoid and os magnum, and rarely, if ever, the semilunar. It is evident, then, that the violence which produces these dislocations has been found clinically and experimentally to result in fracture of the radius in the majority of cases. It is only when the conditions as to the force and the relative position of the hand and forearm are favorable that a dislocation will result.

Twenty-five of the patients fell from a height varying from several feet to seventy-five feet, striking the ground on the outstretched hands. Of the others, some slipped and fell on the side-walk; twice the hand was caught in machinery; three were hurt by striking a blow with the flat hand or fist; in one instance stones and rafters fell on the outstretched hand, the elbow happening to be fixed against a wall; in another instance the force was applied in exactly the opposite direction, viz., the extended hand resting against an immovable object, a piston-rod struck the elbow. Direct blows on the wrist have never been assigned as a cause.

Diagnosis.—In a large proportion of the simple cases reported, the condition had been diagnosed "fracture of the radius," and the patients were not seen by the reporter of the case for some time after the accident, having been treated by another colleague (Chisholm, Berger, Stoffel, Eigenbrodt, and Smith). The patients applied for the relief of continued pain, or on account of deformity and impaired function, which resisted all the usual measures employed in fracture (passive motion, massage, etc.).

Where there is a history of a fall upon the hands, espe-

cially if violent, and there is evidence pointing to involvement of the wrist, the possibility of a carpal dislocation should not be forgotten. While it is true that a fracture of the radius is the most common result of such an accident (excepting a sprain), I am sure that the dislocations in question will be more frequently discovered if looked for, and that some old fractures, with persistent deformity, hand "en griffe," pain and atrophy of the hand muscles, will be correctly diagnosed and treated.

The presence of a bony projection on the palmar surface of the wrist, or slightly above or below the same, without any palpable evidence of fracture of either the radius or ulna, and associated with considerable impairment of active and passive motion at the wrist, atrophy of the small muscles, or sensory and motor symptoms pointing to either the median or ulnar nerve, any and all are points in diagnosis. Again, the projection of bone may be on the dorsal surface of the joint; it may be movable and reducible, or more or less immovable and irreducible. There is no nerve involvement in the dorsal form, and the bone is rather more accessible to palpation.

The palmar dislocations especially may be mistaken for a fragment of the radius, so that only the employment of the Röntgen rays will lead to an absolute diagnosis. This aid to diagnosis will surely bring many obscure cases to light. An anteroposterior and a lateral view of the joint should be taken, and compared carefully with the same taken of the normal side, and with an articulated skeleton for reference. Either the bone will be found absent from its usual location, and its shadow seen elsewhere, or on lateral view the same will be seen projecting from the level of its fellows.

In Chisholm's case of anterior luxation of the semilunar, a needle was passed into the dorsum of the wrist, over the normal location of the bone, and absence of the latter thus discovered.

In compound fractures, with the loose bone either plainly visible in the wound or readily accessible to digital exploration, errors are scarcely possible; but the reports show that even under those circumstances the displaced carpal was taken for a fragment of the radius or ulna (Berger).

Treatment.—The treatment of dislodged carpal bones depends, first, on whether the condition is simple or compound; second, if partial or complete; finally, whether the bone is close to its former seat or has been displaced some distance away.

Compound dislocations are treated according to the general principles involving compound fractures. If possible, the bone may be by digital manipulation replaced in its normal position. If the bone be completely or almost detached of its ligamentous attachments, it may be better surgery to remove the same, especially if, as is usual, the wound be dirty, and reposition of the bone difficult. Judging from the cases reported, the function of such a wrist would be rather better without the bone than after replacing it under the conditions described.

In simple luxations, where the bone or bones are only partially dislodged from their relative position, it may require only a little manipulation of the wrist, accompanied by pressure on the projecting bones, to cause them to slip back into place. This is illustrated typically by the os magnum, which is almost always only partially dislocated; to a lesser degree by the trapezium, trapezoid, and scaphoid. As these luxations are liable to recur, an immobilizing dressing must be applied for a time sufficient for the ligaments to be regenerated.

Some of the simple partial luxations could not be completely reduced (Sheldon and Gay), but in spite of this the patients recovered good function.

In simple complete luxations (Buchanan, Taaffe, Smith, Morris, Stewart, Uhde, Mosengeil), where the bone has been forced out of the carpus, but has not been rotated on any of its axes, but lies just outside of its former place, it may be in the same manner reduced by manipulation. If, however, the bone has suffered rotation, more or less completely, as is often the case, then attempts at reduction will probably fail; for, without the aid of sight, the bone cannot be fitted among its fellows without the apposition of the wrong facets, and the interposition of shreds of capsule. If apparent reduction is accomplished by the use of great force, the function may not

be as good as that which follows non-interference or surgical removal. The smooth function of the wrist is based on the mutual harmonious adaptation of all of its bony elements. Should one of these be forced out and reduced with the wrong facets presenting, it may lead to a greater hinderance to motion than would be caused by its entire absence. Where two bones are absent, however, there is usually a marked disability.

Reduction cannot be considered at all where the bones are found some distance away, in an upward or downward direction. The cases are usually seen weeks after the accident, and, as is illustrated by my case, the bones are so embedded that it is idle to think of reposition. If they do not interfere with motion and the hand is useful and strong, then there is no indication to interfere.

Removal may be practised in cases where the bones seem to offer mechanical obstruction to free motion (Chisholm, Folet, Dubar, and Eigenbrodt). Furthermore, if there is nerve pressure, excision will bring relief (Berger's two cases, Gamgee, Cameron).

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THE TREATMENT OF INFANTILE SPASTIC PARALYSIS.[1]

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I VENTURE to bring before you a subject which for many years has interested me, and which until quite recently has, so far as treatment is concerned, suffered unmerited neglect. There is something so uninviting and hopeless-looking about a case of cerebral diplegia, that a man must possess, in addition to a theory of attack, no small fund of enthusiasm before he decides on treatment. Cases of infantile hemiplegia, with half their brain and half their extremities in working condition, offer less obstacles to management, if less scope for ingenuity.

It is impossible to enter fully into the subject of cerebral paralysis, but I can indicate certain clinical types which offer adequate reward to surgical endeavor, and point out the remedial methods which in my experience have proved of value.

For the purposes of this paper, I would group cases into those of (1) Infantile Hemiplegia; (2) Cerebral Diplegia, and (3) Spastic Paraplegia.

Of 839 cases I have been able to collect from various sources, 510 were hemiplegic, 30 monoplegic, 142 paraplegic, 157 diplegic. This vast disproportion between the hemiplegic and the other groups is not borne out by my own experience, which favors the preponderance of the diplegic type.

Most generally the hemiplegia is an acquired, not a congenital, affection. It usually appears before the fourth year. The onset is very often heralded by convulsions, and in quite

[1] Being a paper read before the Liverpool Medical Institution, March 7, 1902.

a number of cases there are acute febrile symptoms which are in interesting contrast to the onset of adult hemiplegia.

From the first, the reflexes are exaggerated and the arm and limb are powerless. Deformities soon follow. The foot is arched and adducted; the knee is bent; the hip is internally rotated, somewhat adducted, and the femur is bent on the trunk. The arm is huddled to the body; the elbow is flexed to a right angle; the wrist is dropped; the hand pronated, and deviates towards the ulnar side, and the fingers generally grasp the thumb, which lies very forcibly adducted. As in the case of adults, rigidity of the affected muscles comes on in the generality of cases. This rigidity becomes more marked if the limb be moved either passively or by the child, and disappears under an anæsthetic. The aphasia so often present is motor in character and may accompany either left or right hemiplegia. Then follows an inequality of growth. This is more marked in the arm than in the leg; a fact probably accounted for by the difference in nutrition due to the more frequent exercise of the leg. I have seen the affected arm three inches or more shortened; it is rare to find the leg over an inch shorter than its fellow.

Of chief interest to us from the point of view of treatment are the following facts:

(*a*) The upper limb is more severely affected than the lower;

(*b*) The lesion of the upper limb is more permanent;

(*c*) The power of dorsi flexion of the hand with simultaneous extension of the fingers is lost;

(*d*) That movements are performed without precision, spasmodically, and slowly;

(*e*) That the power of adduction of the thumb is often lost.

The disabilities of the lower limb are generally:

(*a*) Contraction of the knee;

(*b*) Extension of the foot;

(*c*) Internal rotation of the femur with adduction;

(*d*) General rigidity.

The cerebral diplegic group is by far the most serious, as

we have here to deal with both arms and feet. Unless the hands can be used, the surgeon is sorely handicapped in any effort he may make to improve the condition of the limb. Clinically, we may divide this group into

(*a*) Cases with and cases without severe mental complication;

(*b*) Complete and partial disability of hands;

(*c*) Complete or partial disability of limbs;

(*d*) Cases complicated by athetotic movements.

In a number of cases the spasm is confined to the limbs, and this is the group to which we give the name of Little's disease or spastic paraplegia. Of the vast majority of cases even in this last group, a varying degree of mental derangement will be noted, and in many athetotic movements are present. A typical case of spastic paraplegia brought to the surgeon at the age, say, of twelve months is characteristic. Usually no contractions have occurred at the hip or knee; the child's legs are rigid; the toes are pointed; there is usually no internal rotation, and adduction is not sufficiently severe to cause a crossing of the limbs. The reflexes are exaggerated; the patellar reflex not usually causing a knee-jerk, but a leg-jerk. If the little patient be held by its arms, there is no endeavor made to separate the limbs, and should the toes be brought to the ground, and an effort made by the child to walk, both limbs move synchronously and in parallel lines. When passive separation of the limb is made, although it is easily effected, one can see and feel the antagonistic efforts of the powerful adductors. If at a later stage the patient is able to walk, several changes will be noted. The adduction will be more marked; the scissors walk will have developed, and a characteristic dragging of one knee around the other will be noted, which becomes more pronounced when any attempt at running is made. The body pressure is mainly transmitted to the ball of the toe. These contractures, however, at this stage, are generally spasmodic, and there is no appreciable shortening in muscle length. This shortening occurs at a still later stage, and is known as contracture.

In quite a number of cases the patients are in a hopeless position as far as walking is concerned. Any effort they make to move only serves to throw the muscles into violent contractions and the legs into extreme adduction. The most severe type of contractions in the legs may be associated with but very slight mental defects and unaccompanied by diplegia.

Before discussing treatment, I will briefly touch upon the pathology of spasmodic paralysis, if only to suggest how futile are operative procedures directed to the primary lesion. The pathological conditions in hemiplegia, paraplegia, and diplegia are the same in kind. The symptoms are due to the retardation of growth resulting generally from embolism or thrombosis together with changes in the spinal cord. In later cases one finds wasting and sclerosis of the motor tracts, with often a loss of substance in the form of cavities or cysts known as porencephalus. These cysts occur on the surface of the brain, and sometimes dip fairly deeply into it. They seem to be a late result in a growing brain, and to have produced an extensive scar substitute for cerebral tissue. Should the porencephalus or sclerosis be unilateral, hemiplegia results. If the scar is bilateral, diplegia or spastic paralysis ensues. The lesions, therefore, are a late product of a hæmorrhage, an embolism, or a localized encephalitis. In the cord, degenerations of the pyramidal tract or the lateral columns are to be found. Sachs and Peterson have analyzed seventy-three autopsies and found the following conditions: Atrophy sclerosis and cysts, 40; hæmorrhage, 20; embolism, 7; thrombosis, 5; tubercle, 1; total, 73.

Osler, in an examination of ninety brains, found a vascular lesion in sixteen,—seven due to hæmorrhage, nine to embolism.

The treatment of spastic paralysis has been too long in the hands of the physician for much real progress to have been made. Indeed, from medicine in this affection we have nothing to expect, apart from very indirect results, and we have only to scan the text-books on neurology to realize the note of pessimism which is sounded. Even Sir William Gowers, in his

"Diseases of the Nervous System," says, "The tendo Achillis is sometimes divided for contraction of the calf muscles in infantile spastic paralysis, but the operation is useless, and ought never to be performed." The same opinion has been pronounced by other distinguished men, so one can see how surgery has been silenced in the matter. I would argue that a large proportion of children suffering from severe spastic paralysis may be transformed into useful members of the community, improved both in body and mind by surgical methods, enabled to walk with comparatively little deformity, many requiring only the aid to be derived from one or two sticks.

The class of cases which we can place outside remedial art is the idiot, the microcephalic, and the violent, irritable type of diplegic, so often seen, subject to fits and active athetotic movements, who has generally lost all control over his secretions. The treatment of any condition short of this may be undertaken with varying success, subject to conditions which obtain in any surgical case requiring prolonged attention. For instance, active treatment may be needed for nearly two years. It would therefore be unwise to admit a case into hospital for two months, and then send it to a miserable home where neglect would be the inevitable sequence. Such a case, however, after hospital treatment, secure in the care of anxious, intelligent parents, no matter how poor, would prove a credit to all concerned. These are important matters which the surgeon must consider before he undertakes his work. Another class which gives the greatest anxiety and trouble is that where the affection of the hands is of such a kind as to promise but slight hope of their assistance to the limbs during walking. Before despairing, however, I think it is well to give such hands the opportunity of a careful trial, both as a mental discipline and because success sometimes exceeds expectation.

I would divide the treatment of all cases of spastic paralysis into operative and postoperative, for, although mechanism is involved in nearly every case, there is hardly a case which we are called upon to treat without invoking operative aid.

Infantile hemiplegia usually affects the arm much more

than it does the leg. This is almost invariably the case, and in this particular it differs from diplegia, where, when the four limbs are attacked, the hands are frequently less severely affected than the limbs. Indeed, in hemiplegia the paralysis of the hand is sometimes absolute, and in addition we have a complication in the shape of rigidity. The behavior of the lower limb differs also from that of spastic paraplegia in that the adductor spasm is proportionately not so marked.

The treatment of the hand and arm in infantile hemiplegia is distinctly less promising than in the diplegic case; but there are clinical signs to which I would draw your attention which help us to prognose success or failure. If the paralysis is complete, or, in other words, if the little patient is never known to relax his spasm, treatment is futile. If he only moves the fingers of his affected hand in conjunction with the fingers of the opposite side, the results will in all probability be discouraging. In all cases where the parents are able to say in the spirit of true observers that the patient is able to do more with the hand now than a little while ago, the success of treatment is assured. Similarly, where any degree of voluntary relaxation of spasm exists apart from an associated movement on the opposite side, treatment is emphatically indicated.

Noting that the dominant deformity in both hand and elbow is pronation and carpal flexion, treatment should consist in fixing the elbow supine and in hyperextending the wrist. The hyperextension of the wrist should be combined with that of the fingers, and a special arrangement adapted to keep the thumb at right angles to the palm. The spasm in these cases is often so pronounced that the extension of the wrist and fingers must be brought about very gradually. If the elbow is accompanied by contracture of the biceps and brachialis anticus, supination may be combined with extension. If this be not the case, the flexed position of the elbow will suffice. If, instead of being firmly pronated, the elbow lies semiproned, it is not necessary to treat it, and all one's energies should be directed to the hand.

It is difficult to give a reason as to how improvement

comes about, but it may be taken as an axiom that prolonged fixation of spastic muscles in a position opposed to their contraction lessens the severity of the spasm. This is true wherever spasm may be found, and its influence may be tested even in spasmodic torticollis, intractable as we know that affection to be. It would appear as if the group of muscles at last got tired of trying to pull. If the case be mild, this treatment may be discarded in about twelve months, if during the whole of that period the extension has been kept up without intermission. The test for relaxation must be the power of voluntary movement, however slow it may be. It will be noted that generally at this stage the patient, in endeavoring to extend his wrist, will first of all close his fingers, and will only open them on completion of extension. The process is reversed when the wrist is flexed. In order to meet this difficulty, the splint employed to extend both wrist and fingers is modified so as to extend the wrist alone and allow freedom to the fingers. At this stage or earlier, the surgeon may decide whether in a given case success may be predicted, and, if he is in doubt, operation should unhesitatingly be performed. Operation will consist of tenotomy or tendon transplantation; myotomy need only be mentioned to be avoided. An incision is made over the tendon of the flexor carpi ulnaris just above the annular ligament, another is made over the flexor carpi radialis, and both tendons are divided low down and taken: (*a*) the flexor ulnaris to be inserted into the extensor ulnaris, and (*b*) the radial flexor into the radial extensor. I performed this operation some years ago upon two spastic children, whom I showed before the Society for the Study of Diseases in Children, and in both instances voluntary movements were steadily performed, and one, a girl of nine, was able to write quite a respectable hand. At the present time one of the worst cases of athetosis in connection with cerebral diplegia is an inmate of the Liverpool County Hospital for Chronic Diseases of Children. When he entered the hospital, nearly two years ago, both limbs were firmly adducted, contracture had occurred, which had so affected the feet that plantar flexion had taken place with

almost evulsion of each astragalus and cuboid, the skin of each dorsum being reddened by pressure from within. The hands were firmly flexed and but little voluntary movement existed. Athetotic movements, more resembling chorea with occasional jerks which almost lifted the patient from his bed, complicated treatment. So far as the hands were concerned, hyperextension such as I have described was practised, and, later, division of the flexors of the wrist. The little patient has steadily progressed. He can voluntarily move his limbs in all directions; with aid he can take a few strides. In order to overcome severe spasmodic pronation of the forearm, Mr. Tubby has changed the point of insertion from the front to the back of the radius, of the pronator radii teres, thus transforming the muscle into a supinator. So far this operation has been performed seven times by him, and I intend practising it on a series of cases during the summer.

Tenotomy alone has proved distinctly disappointing, although one has had an occasional successful case. The operation should be confined to the division of the flexor carpi radialis and ulnaris. It is, in my opinion, better to elongate the other flexors of the hand by a long median incision, such as one would employ in lengthening the tendo Achillis. Tendon transplantation, however, is a better operation, less complicated, and more reliable. The surgeon's art, however, does not end with the operation, and hyperextension of the wrist, leaving the fingers free, should be practised for a further few weeks. In order to prevent adhesions after the operation, the wrist should be freely, but withal very gently, moved in about a fortnight's time. Whether an operation has been performed or not, the final stages of treatment are identical. They should consist in getting both guardian and patient to strive every nerve to urge and practise movements from simple to complex. The surgeon must inspire confidence and instil enthusiasm. Failure depends upon men as well as measures, and a thoughtless, impatient word of discouragement may paralyze all effort.

The nature of the movements to be practised must be left

to the ingenuity of the surgeon. The principle which should govern him may, however, be indicated here:

(*a*) The movements should be practised slowly and without excitement;

(*b*) They should be made interesting to the child;

(*c*) Those opposed to the direction of deformity should predominate;

(*d*) Those presenting the greatest difficulty should be chiefly practised.

Just a word before we deal with paraplegia regarding tenotomy of the spastic muscle. Empiricism has taught us that for some reason or another tenotomy lessens both in frequency and intensity the spasmodic element in paraplegia. I do not merely mean to say that division of the tendo Achillis controls spasm in the calf muscles,—although, of course, it does,—but rather that spasm in which those muscles are not directly concerned is also influenced. This is beyond all question, and must have been noted by everybody who has had the opportunity of observing, and the fact has now reached the robust stage when physiological explanations are vouchsafed.

Whitman urges that by elongation of the tendon the response to the exaggerated motor impulses is lessened, and an opportunity for more effective control is afforded.

Mr. Tubby has propounded the theory that once the immediate pathological effect of the central nervous lesion has subsided, the spinal cord remains in a state of undue reflex excitability. A tightly contracted muscle and tendon tend to augment this condition, and so induce in themselves further contractions. In other words, there is a vicious circle of reflex action which can be interrupted by section of the tendon, and diminution in the tension of the affected muscle and tendon.

Lorenz attributes the good effect to the shortening of the bellies of the tenotomized muscles, so that their range of action is diminished. Both these theories refer, of course, to spasm with which the divided muscle is concerned, and do not explain the diminution in spasm experienced elsewhere. We must further remember that the opponents of contracted muscles are

always elongated and weak, and that the rest afforded them by tenotomies, by relieving them of strain, helps to restore muscular equilibrium.

The practical deduction from these observations is that no opportunity should be lost of performing a tenotomy. Even in mild cases, where a spastic tendon is to be felt, let us ruthlessly divide it.

If the surgeon has decided that a case of spastic paraplegia is suitable for treatment, a splint should be prepared, so designed as to keep the limbs in marked abduction. The area over the hamstrings, the adductors at the groin, and the tendo Achillis, should be suitably prepared for operation. The adductors should be first attacked. An incision an inch and a half long should be made to the inside of the adductor longus. This muscle should be seized by a Spencer Wells or a small Doyen forceps, and about three-quarters of an inch of it removed. The limb is then abducted, and portions of the adductor brevis and gracilis are exsected in similar fashion. The horizontal portion of the adductor magnus and, if necessary, the pectineus is divided, and also any tissues, muscular or fibrous, obstructive to an absolutely free abduction of the femur. Experience has shown me that, although the chief offenders are the adductors longus and brevis, nevertheless the deeper muscles often require division. To any one who has practised the operation, the futility of attempts to effectively divide the muscles subcutaneously will be apparent. Division is followed with but little hæmorrhage, and the wounds are closed without drainage. Having exsected the pieces of the adductors, each tendo Achillis is divided subcutaneously and rectangular splints are applied to the foot. The limbs are then well abducted, and the surgeon notes whether there is any obstacle to easy extension of the knees. If there should be (it is not often the case), an open incision must be made on each side of the popliteal space, and the tense hamstrings are in turn divided. If these incisions are long enough, the fascial contraction can be attacked on either side, for it is here that opposition is often found. I would discourage the

use of a transverse incision, as, when adopted, it often seriously hampers the surgeon's efforts to fully extend the knee by reason of the strain cast upon the sutures. In 1885, when I was at the Stanley Hospital, there used to be an adult diplegic in a perambulator always at the gates, and on two or three occasions I took him in to try and straighten his contracted limbs. On one occasion I removed about an inch from each of the hamstrings, but he was mentally so deranged that we did not do each other any credit. I mention the fact, however, because Lorenz, of Vienna, has quite recently written on the advantage of exsecting portions of the hamstrings.

We have now presumably got our patient comfortably stretched upon an abduction frame, and we must keep him there for three months. The wounds heal very rapidly, and suppuration has occurred in the adductor cavity on three occasions only, despite the insanitary position of the wounds and the number of operations performed; for instance, in 1890 I operated on twenty-seven patients, and this may be taken as a fair index of my yearly return.

At the end of three months the splint is taken off during the day and movements are sedulously practised. For some weeks stiffness exists, and often the movements are at first painful, but after a time, always shortened by vigorous exercise, the pain disappears, and the effort must be made to walk.

The splints are of a simple kind designed to keep the knee from bending. The boots should be made of felt with substantial soles. The nurse should be instructed to keep both boots and splints upon the patient day and night, and, for the first two weeks, frequently during the day, abduction, adduction, flexion, and extension of the hip should be practised. This should be done with and without resistance. At nighttime the feet should be attached to the side of the bed in order to maintain abduction. After the first few days of this later stage of treatment, the splints should be removed twice a day and the muscles well massaged, and both active and passive movements of ankles, toes, knees, and hips encouraged. Any movement executed in a jerky style should be practised until perfected.

The little patient may now try to walk. It will be noted that one of the difficulties of an untreated spastic when he tries to walk is the narrowing of the pedestal upon which the trunk rests by reason of the adducted limbs. Operation has now overcome this, and with abducted limbs the body is poised upon a widened pedestal. During early training, the nurse must see that, while walking, the limbs are not approximate, and that, from the first, swinging of the limbs must be prohibited. Crutches should not be allowed until the patient has been taught to stand unsupported. I need not enter into any more detail regarding this most important stage of treatment, but would add that it affords an inexhaustible field for ingenuity, and that upon the intelligence and industry of the nurse very much depends.

Diplegic hands are treated on the same principles as I have enunciated in regard to infantile hemiplegia, and they must be trained to hold sticks and crutches with a firm, unyielding grip. I cannot now deal with individual cases, but I may say I have operated on cases from twelve months to twenty years of age. A large number of these were so bad that they had never attempted to place one foot before the other. Some were structurally flexed (contractured) at ankle, knee, and hip. A most helpless youth of twenty, one limb across the other, was able in six months to stand erect and walk with two sticks, and twelve months later could move his limbs north, south, east, and west, with hardly an appreciable jerk. Success in an ancient case, where so much has to be unlearned, and where the mechanical stage offers such difficulty, proves the accuracy and efficacy of the principles I have endeavored to expound. It is logical to infer that, if old neglected cases are amenable to surgical education, our prognosis should be very hopeful in the young.

With regard to the degree of benefit to be derived from treatment, the parents should be given to understand that under favorable conditions of nursing and tuition the child, aided by the hand or sticks, will be able to walk varying distances in from twelve months to two years, and that with perfectly

straight limbs and heels on terra firma. A large proportion of cases will later on manage aided by one stick. Even in the least successful cases, parents, mostly having despaired, are full of gratitude. The mental condition of the children obviously improves when their physical defects are remedied and they are enabled to mix with their little friends. Complete recovery in spastic paraplegia is, of course, impossible.

It will be gathered from my remarks that I wish to urge that the treatment of spastic paralysis should resolve itself into a system. Such a system involves operative, mechanical, and educational stages. The treatment cannot be separated into parts. If the surgeon is not satisfied that the case is to be under his control for twelve months, he will consult his reputation best by leaving it alone. Operations not followed up by careful and prolonged after care give rise to disappointment and discredit. Merely dividing tendons to be followed by massage and electricity is futile and dispiriting.

TRANSACTIONS

OF THE

NEW YORK SURGICAL SOCIETY.

Stated Meeting, November 26, 1902.

The President, LUCIUS W. HOTCHKISS, M.D., in the Chair.

CONGENITAL DISLOCATION OF THE HIP.

DR. ROYAL WHITMAN presented a child, two and one-half years old, with a congenital dislocation of the left hip, which was reduced by Dr. Whitman ten months ago by the bloodless method. After the reduction, a plaster bandage was applied and kept on until two months ago, when an ordinary cotton bandage was substituted, which had been removed to-day. The two limbs are now absolutely equal in length, and the head of the femur can be felt in its normal position in the centre of Poupart's ligament. The child does not limp, but has a characteristic rolling walk, which is an indication of the evening up of the gait.

Dr. Whitman said he regarded one and one-half to three years as the most favorable age for operation in these cases. At such an early age there is practically no after-treatment necessary, and the speaker said a relapse had never followed in a case presenting the indications of success illustrated in the patient presented. In fact, the patient was shown for the purpose of demonstrating these indications.

Under favorable conditions, Dr. Whitman said he thought he might be able to effect an absolute cure by this method in more than 50 per cent. of the cases of congenital dislocation of the hip. One very common obstacle to the successful application of this method is an anterior twist of the neck of the bone. In such cases the dislocation can be reduced, but the head will not stay in its normal position until the deformity is remedied by an osteotomy.

In response to a question, Dr. Whitman said that in the case he had shown there was an actual reduction of the bone, not a

transposition. The latter procedure is always accompanied by slight shortening and a limp. Transpositions are often called successes when they are not such at all.

DOUBLE HALLEX VALGUS.

Dr. Robert H. M. Dawbarn presented a woman upon whom operation was done two years ago. The result has been ideal. After applying a tourniquet at the thigh, a semicircular incision, with its convexity outward, was made, and the flap turned in. The joint was then opened, and with the Gigli wire saw the head of the first metatarsal bone removed, and the flap stitched with interrupted catgut sutures. Next the toe was put into the straight position and a short splint made of a strip of cigar-box, boiled and padded with gauze, applied to the sole and this toe, being careful to maintain a gap, where the head was, to be filled by blood. Gauze dressings cover the foot, then gutta-percha tissue, and finally a plaster-of-Paris splint encases all, carried up to the knee. Only then is the tourniquet removed. The splint is left on for about four weeks, and the patient then has a painless, freely movable false joint. Healing has taken place by the Schede moist blood-clot method, the clot organizing into connective tissue with great speed.

The deformity in these cases of hallex valgus consists always in the subluxations of the first metatarsal bone and first phalanx, and practically never is there any bony hypertrophy. As to the accompanying bursitis, this is ignored and will disappear unless already suppurative; in which case the operation needs two stages. In the first the bursa is cleanly excised. After sound healing, the operation above described is performed. Dr. Dawbarn said he had done this operation in at least fifty cases, and every one had been successful; but any break in asepsis would obviously be disastrous. The operation does not necessitate the cutting of any tendons nor interference with the sesamoid bones, nor with the base of the first phalanx. The toe is shortened from one to one and one-half centimetres. The only point of originality claimed is the shape of the flap. This gives abundant room, as needed, but is so placed as not to be pressed upon by the shoe later on. The scar is semicircular, or in bad cases even horse-shoe in shape,—toe outward.

The slight shortening of the toe is of no importance, and, instead of being a deformity, it is quite the contrary, as the foot then more closely conforms to the type handed down by the Greek sculptors.

In conclusion, Dr. Dawbarn said he hoped the members of the Society would continue to use his suggestion, the term "Hallex valgus" instead of "hallux valgus:" the latter term is the one universally used in the text-books, but there is absolutely no good Latin authority for it. There is no such word in the Latin language as "hallux."

DR. WHITMAN thought perhaps Dr. Dawbarn was rather too enthusiastic in regard to the improvement in the appearance of the foot after the operation he had described. The result obtained in the case shown was extremely good, but he was inclined to believe that after some of these operations there would be even a greater shortening of the toe than in this instance.

CONGENITAL TALIPES EQUINOVARUS.

DR. HOTCHKISS presented an Italian, aged thirty-four years, who was operated upon, March 6, 1902, for congenital talipes of the right foot. The case was of especial interest on account of the age of the patient, the extent of the original deformity, which was extreme, as shown in the plaster cast exhibited, and on account of the excellent result, functional and cosmetic, which had been obtained.

The operation had consisted in the removal of the astragalus, the scaphoid, a portion of the anterior end of the os calcis, and the posterior end of the cuboid, flush with the articular surface of the external cuneiform. This had been accomplished through the incision recommended by Lauenstein for the removal of the astragalus, *i.e.*, an incision beginning at a point well up on the shaft of the fibula and extending down to and over the external malleolus, thence forward along the outer border of the foot and curving forward upon its dorsum. Through this cut the external lateral ligaments of the ankle are divided, the astragalus dislocated outward and easily removed, and the other bones were easily dealt with. The tendo Achillis, which was very small, was divided, but retracted only slightly. After the removal of the bones the foot easily fell into approximately normal position, but the

contraction of the soft tissues of the inner arch seemed still to hinder a perfect reposition, and they were divided by the open incision of Phelps. The foot was held in a somewhat over-corrected position after suture of the external wound and covered with a large dressing, over which a plaster case was applied.

The Phelps incision had healed aseptically under the blood-clot, but the external wound had discharged sloughs and had healed finally by granulation, most of the sutures being removed on account of tension due to the accumulation of fluids in the dead spaces. The final result as shown was most excellent. The patient now has a small, flat, but straight, and very useful foot. There is very slight motion at the new ankle-joint; the patient walks with scarcely a limp, wears an ordinary shoe, and is getting about better every day.

In connection with this case, Dr. Hotchkiss showed a plaster cast, which demonstrated the extent of the deformity previous to the operation. The speaker said that in these cases of extreme deformity, in adults, enough bone must be removed to allow the foot to be easily over-corrected. The removal of a wedge-shaped piece of the tarsus is not generally sufficient.

Dr. Whitman said that while the result obtained by Dr. Hotchkiss was extremely good, he would suggest the advisability, in these extreme cases, of dividing the operation into two or three sittings rather than to attempt to correct its deformity at once. If one were content, at the first sitting, to give the foot a vigorous stretching, and at the second sitting to do a Phelps operation, splitting the foot wide open, it would eventually be found necessary to remove less of the bony structure.

EXTENSIVE DIFFUSE PERITONITIS CAUSED BY A GANGRENOUS APPENDIX; PERITONEUM CLOSED WITHOUT DRAINAGE.

Dr. W. G. Le Boutillier presented a lad, sixteen years old, who was operated on October 23, 1902. He was admitted to the hospital on the fourth day of an illness that had begun suddenly with cramp-like pains in his abdomen, soon succeeded by vomiting. The pains had not been localized, vomiting had been persistent, and there had been constipation and great prostration.

When admitted, he was apathetic and suffering from general abdominal pain. The abdomen was moderately distended and tender all over, but tenderness was greatest in the lower portion, and particularly on the right side. Here the muscles were extremely tense, although there was some muscular rigidity all over the abdomen. No tumor could be felt. The leucocyte count was 14,800. Pulse, 96; temperature, 101.6° F.

The operation was done two hours after admission. A small incision was made by McBurney's method over the usual site of the appendix. On opening the peritoneal cavity turbid serum escaped, and the intestines were found deeply congested and in places slightly adherent. The wound was enlarged sufficiently by cutting across the fibres of the internal oblique, and the appendix found near the median line, dropping over the pelvic brim. The appendix was gangrenous in distal half, perforated near the tip, and surrounded by a small abscess of stinking pus, shut in by firm adhesions. The pus was sponged away after isolating the rest of the abdominal cavity by gauze, the appendix removed, and stump invaginated in the usual way. The general abdominal cavity was explored completely, and the intestines were largely exposed by evisceration. The inflammation was most acute on the right side, where the coils of gut were almost purple in color, coated with fibrin and pus. Sponges on sticks passed to the neighborhood of the loin and spleen were withdrawn coated with fibrin and charged with a thin seropurulent fluid. Much of the loose fibrin was detached from the intestines by sponging, and large quantities of saline solution were used to flush the abdominal cavity. When this returned clear, the intestines were replaced and protected, and the patient gradually raised in Trendelenburg's position. The pelvis was filled with stinking pus, which escaped through the wound, and the pelvic walls were thoroughly sponged and irrigated. The intestines were acutely inflamed wherever seen. The wound was entirely closed in layers, leaving as much salt solution as possible in the peritoneal cavity, and draining only the subcutaneous tissues with folded rubber tissue.

Recovery from ether was prompt and satisfactory. During the night the patient vomited once, and had considerable abdominal distention, pain, and great thirst. Morphine was given in moderate quantities, and the rectal tube inserted to relieve the

distention. Salt solution eight ounces, with one-half ounce of whiskey, were given by rectum every two hours and absorbed.

During the next twenty-four hours vomiting occurred three times, but stopped after washing out the stomach. Hot water by mouth in small quantities was allowed. Pulse ranged from 108 to 90 and the temperature fell to 99.4° F. Two fæcal movements resulted from enemata.

On the fifth day the temperature was rising, although the pulse was ranging from 72 to 90. The wound was reopened down to the peritoneum, as it had become infected by the pus which passed over it at the operation. The peritoneum, however, was not reopened. The subsequent progress of the case was uneventful; the patient was allowed to sit up out of bed on the thirteenth day, and to go home on November 16.

THE PRESENT STATUS OF THE TREATMENT OF MALIGNANT TUMORS WITH THE X-RAY.

A paper with the above title was read by Dr. William B. Coley.

Dr. Dowd said he had seen some of the cases to which Dr. Coley referred in his paper, and had witnessed the good results following the treatment. In some cases of his own in which the X-ray treatment had been tried, there had been a diminution in the pain, but the progress of the disease was not stopped.

Dr. Coley had called attention to the danger of the X-ray treatment in cases that should be treated by operation. Some X-ray therapeutists are so enthusiastic regarding the treatment, that they refuse to admit that any of these cases should be treated by operation; although, in fact, the curative effect of operation is much better established than that of the X-ray. Early cases of breast cancer, for instance, should not be deprived of the well established advantages of operation while the experimental use of the X-ray is being made.

Dr. Dawbarn emphasized the point that in cases of malignant growth that are clearly operable it is dangerous to wait until the X-ray treatment has been given a trial. A number of cases in which this had been done with unfortunate results have come under his observation. One patient with cancer of the lower lip upon whom he recently operated for Dr. MacCracken,

of this city, had been previously subjected to the X-ray treatment without any benefit whatever, and during that time a lymphatic node below the jaw had become involved. The removal of this added to the severity of the operation, and the fact of its occurrence greatly increased the prospects of a recurrence of the disease. While the X-ray treatment is beneficial in many of these cases, it is very unwise to depend upon it in every instance, and thus delay operative interference. It would seem, in simple cases, safer to excise, and then use the X-ray to prevent recurrence.

Dr. Willy Meyer said that while his experience with the X-ray treatment of malignant tumors was very limited as compared with that of Dr. Coley, still, he has seen some remarkable results follow its use, especially in epitheliomata. He thought the X-ray treatment was particularly indicated in cancer of the breast subsequent to removal of the tumor, because in those cases, in spite of a far-reaching excision, we know that cancerous tissue is very apt to be left behind. In all of these cases, the speaker said, X-ray applications should be given as an after-treatment.

Dr. George D. Stewart reported the case of a man, sixty the root of the nose and both eyelids, apparently a carcinoma (although the diagnosis was not confirmed by a pathological examination), which disappeared entirely under the X-ray treatment, leaving scarcely a trace behind. If this case had been operated on, it would have necessitated an extensive dissection and a subsequent plastic operation, and would no doubt have left an ugly scar.

In conclusion, the speaker emphasized the fact that in spite of the surprising cures that are occasionally reported by the use of the X-rays, and no matter how rapid the strides that are made in this method of treatment, operable cancer surely belongs to the surgeon, and the after-treatment to the X-ray therapeutist.

Dr. George D. Stewart reported the case of a man, sixty years old, who presented himself last January with a deep, ulcer-like epithelioma of the side of the neck. It was more than three inches in diameter, extending over the ramus of the jaw, the bone being apparently thickened and its periosteum extensively involved. A specimen of the growth was sent to Dr. Brooks, who pronounced it an epithelioma.

An operation was undertaken, not with the idea of com-

pletely eradicating the disease, but simply for the purpose of improving the condition. As much as possible of the growth was excised. It was found to involve the external carotid artery and the deep jugular vein, and, as the operation had already been somewhat prolonged, it was decided to stop and perhaps do a subsequent operation. Instead of this, he was subjected to the X-ray treatment for about a month. During this interval the cavity left by the operation, which was very deep and over three inches in diameter, gradually became filled with granulations. These were subsequently covered by skin-grafts, cut according to Thiersch's method, some of which took and others did not. At any rate, the patient felt so well that he soon left for his home.

When he presented himself again, a few days ago, he was apparently cured. The cavity had entirely filled, and was covered with fair integument which was slightly eczematous about the margin of the wound.

Dr. W. B. Coley asked that Dr. F. S. Mandlebaum, Pathologist to the Mt. Sinai Hospital, be permitted to show a microscopic specimen from the sarcoma of the femur which had been presented by Dr. Rogers at a meeting of the Society a month ago, and who was well more than four years after toxin treatment. In the history of the case which was given by Dr. Rogers at the time, some doubt had been raised as to the accuracy of the diagnosis of sarcoma on account of the subsequent development by the patient of a condition in the nose which had been regarded by one observer as specific.

The specimen shown by Dr. Coley was a typical giant-celled sarcoma, and had been so pronounced by Dr. T. Mitchell Prudden, Professor of Pathology at Columbia University.

Dr. F. S. Mandlebaum, the pathologist of Mt. Sinai Hospital, who had made the microscopic examination in the case shown by Dr. Rogers, stated that when the patient was first admitted to the hospital, on May 24, 1898, she had a fracture of the neck of the femur, caused by slipping on the floor four days previously. The limb was kept in Buck's extension for nine weeks, and the patient left the hospital on July 24, before union had occurred. In November of the same year she fell, and felt a sudden snap in the region of the original fracture. This was followed by pain, and when the patient returned to the hospital,

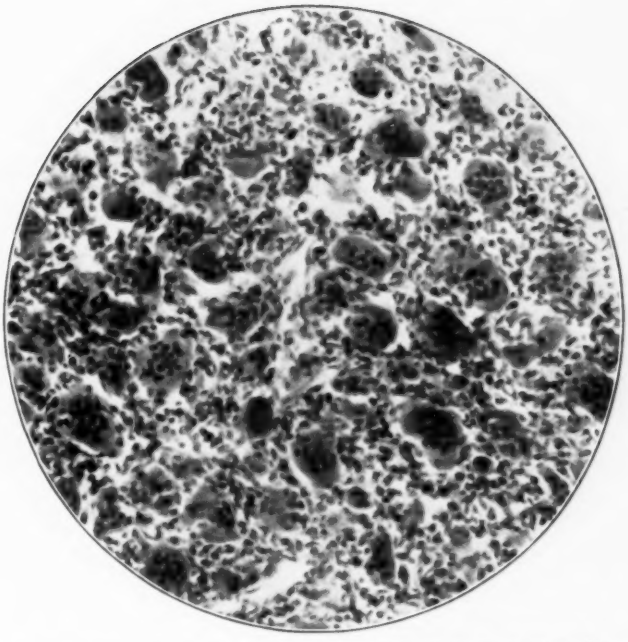
on December 20, she was apparently suffering from an ununited fracture of the neck of the femur. There were two and one-half centimetres shortening on the affected side, and false motion in all directions, but no crepitus. A tumor was made out over the outer aspect of the thigh. On January 5, 1899, Dr. Gerster incised this growth and removed a specimen for micriscopic examination. It proved to be a giant-celled sarcoma. Suppuration followed, the patient developed considerable temperature, and broken-down masses of the tumor were discharged. From January 25 to February 19, 1899, the patient received daily from one to three minims of the erysipelas toxins, after the Coley method. In spite of this treatment, the tumor continued to grow, enlarging towards the femoral region. The retroperitoneal glands were much enlarged. From July 27 to August 8, 1899, injections of arsenic were made, and on August 14 she was transferred to the Montefiore Home.

In August, 1901, the patient was operated on by Dr. Rogers, who curetted a large bone cavity, and in February, 1902, by Dr. Elsberg, who cleaned out the cavity and filled it with iodoform paraffin. It was during the latter's service that the patient finally recovered, the sinus in the femur closing up, and all evidences of a malignant growth disappearing. A portion of the material removed by Dr. Elsberg was examined by Dr. Mandlebaum, and this showed only inflammatory fibrous and myxomatous tissue; the former evidences of giant-celled sarcoma had entirely disappeared.

In commenting on this case, Dr. Mandlebaum said that the pathologist is extremely cautious in making a diagnosis of round-celled sarcoma, as a number of instances are on record where sarcoma has been mistaken for syphilis, and *vice versa*. In the case under discussion, however, the diagnosis of giant-celled sarcoma was very clear, and there was no suspicion of syphilis.

As far as the recovery of this patient is concerned, we all know that this occasionally happens in sarcoma. Such a recovery has frequently followed the occurrence of some infectious process, and we know that giant-celled sarcoma is less malignant than other types of the disease.

Slides and photomicrographs of the tumor were then exhibited. (See figure.)



Photomicrograph of section of sarcoma of thigh operated upon by Dr. Rogers.

Stated Meeting, December 10, 1902.

The President, LUCIUS W. HOTCHKISS, M.D., in the Chair.

GUNSHOT WOUND OF THE ABDOMINAL CAVITY, LIVER, AND RIGHT PLEURAL CAVITY.

DR. JOSEPH A. BLAKE presented a man, thirty years old, who was admitted to the Roosevelt Hospital, October 13, 1902, at 7 P.M., who just previous to his admission had been shot in the abdomen. He had always been well and strong and had indulged moderately in alcoholic stimulants. At the time of his admission there was a considerable degree of shock, extreme pallor of the face and lips, air hunger, and the respirations were rapid and shallow. The pulse was feeble and thready in character, but not increased in frequency; the temperature was 99.8° F.; respirations, 28.

Examination showed a bullet wound in the left hypochondrium, passing inward and backward through the outer border of the left rectus abdominis muscle, through which a probe could be introduced about four or five inches inside the abdominal cavity. The bullet was found embedded underneath the skin between the seventh and eighth ribs at the anterior axillary line of the right chest, and had evidently passed obliquely through the body. Examination of the right chest showed dulness below the angle of the scapula, with loss of voice and breathing sounds and a few moist râles. Over the abdomen there were marked muscular rigidity and tenderness, and slight dulness on percussion in the region of the flanks, the level of which changed with the position of the patient.

After the patient's admission to the hospital, the evidences of internal bleeding became more pronounced, and an immediate operation was decided upon. This was done by the House Surgeon, Dr. A. C. Prentice. An incision, eight inches long, was made in the median line, from the ensiform cartilage to the umbilicus. Upon opening the peritoneum, a large quantity of free blood, fluid and clotted, presented. It was rapidly removed with the hands and gauze sponges. The bleeding was found to arise from a wound in the anterior surface of the left lobe of the liver,

and a second wound upon the superior surface of the right lobe, the latter considerably larger than the former, and extensively lacerated. The wound in the left lobe was packed with sterile gauze, which controlled the hæmorrhage. The wound in the right lobe could not be reached through the median line incision, and a second incision, three inches long, was thereupon made through the abdominal wall at the free border of the ribs in the right mammary line. Several strips of sterile gauze were packed between the right lobe of the liver and the diaphragm; the ends of these strips were brought out through the incision wounds, and the latter closed in layers, plain catgut being used for the muscular and aponeurotic structures and silkworm gut for the skin. The sutures were interrupted. Six days after the operation the cutaneous sutures were removed. Shortly afterwards, in a fit of coughing, the median wound gave way, and nearly all the small intestine escaped under the dressing.

The patient was immediately anæsthetized, the intestine washed and reduced, and the wound closed by deep sutures of chromicized gut and superficial ones of silkworm gut. There was some suppuration about some of these sutures, and they were removed, part of the wound healing by granulation.

INTRAPERITONEAL RUPTURE OF THE BLADDER.

Dr. P. R. Bolton presented a negro, forty-five years old, a stableman by occupation, who was admitted to the Hudson Street Hospital on November 9, 1902. On the day before his admission to the hospital (after two days' intoxication), he awoke with a pain in the lower abdomen. This was aggravated on movement, and gradually became more severe, soon extending over the entire abdomen. When the patient came to the hospital he complained of the severity of this pain; he stated that his bowels had not moved for two days, and no urine had been passed in twenty-four hours.

A physical examination showed that the heart and lungs were normal. The abdomen was somewhat distended; it was markedly tender over the whole area and tympanitic upon percussion, excepting over the bladder, which was somewhat flat. Upon the introduction of a catheter into the bladder, ten ounces of clear urine were withdrawn. The bladder was irrigated with

salt solution, and the same quantity that was injected returned clear. Unsuccessful efforts were made to move the bowels by enemata.

As the abdominal distention and pain gradually grew worse, Dr. Bolton made an incision, four inches long, above the pubes, through which half a gallon of pale, amber-colored fluid escaped from the abdominal cavity. The intestines were somewhat inflamed, and on the posterior surface of the bladder a rupture, half an inch long, was found, the edges of which were covered with a fibrinous exudate. The rupture was closed with a double row of silk sutures. A cigarette drain was introduced through the abdominal incision and a tube inserted into the bladder through a small perineal opening. The abdominal wound was dressed every two days, and the cigarette drain was taken out at the end of a week. The perineal tube was removed on the twelfth day. After the tube was removed on the twelfth day, the patient was instructed to micturate about every three hours. There was no leakage. The urine at first contained a trace of albumen and some hyaline casts, but the latter subsequently disappeared.

The patient made practically an uneventful recovery, and was discharged cured on the 6th of December, 1902, after spending twenty-six days in the hospital.

Dr. Howard Lilienthal thought that, in the absence of any history of injury and instrumentation, it seemed more probable that this was a case of perforation resulting from some pathological condition of the bladder-wall.

Dr. Bolton, in reply to Dr. Lilienthal, said he had examined the interior of the bladder carefully with the finger, and could find no evidence of ulceration or other pathological condition of the bladder-wall.

UNUNITED FRACTURE OF THE LOWER EXTREMITY.

Dr. John Rogers presented a girl of thirteen, who, as the result of a fall nine years ago, sustained a fracture of the lower end of the tibia and fibula of the right leg. She was taken to Bellevue Hospital and treated by two competent surgeons by means of the plaster splint, but union failed to occur. The fragments were then wired and the splint reapplied and kept on for

two years, but without success. About five years after the latter operation had been done, sections of the silver wire were extruded through the skin during an interval of several months. Subsequently, a splint was again applied and she wore a shoe-brace, but union did not take place.

When Dr. Rogers first saw the patient last May, there was a very evident fracture of the lower third of the tibia, with a motility almost equal to that of the ankle-joint. Upon opening up the parts, it was seen that the lower end of the upper fragment was a concave piece of bone, without any synovial membrane; the lower fragment was quite pointed, and united to the upper by a thin strand of cartilage. This cartilage was excised, the bony ends freshened, the two fragments sutured with chromicized catgut, and a plaster case applied. The operation was done almost three months ago; it was apparently not followed by the formation of callus, and only slight union has occurred. There were of treatment, good bony union seemed impossible or indefinitely and this of course still persists.

Dr. Rogers said he could not account for the lack of union in this case. There was no specific history or other constitutional disease, and no indication of rickets. The case was presented as one of that fortunately rare kind in which, in spite of the best of treatment, good bony union seemed impossible or indefinitely delayed.

Dr. F. Kammerer said that, while he had not seen any of these cases in recent years, he thought it was not very unusual that a bone should refuse to unite, even after repeated operative interference. He did not know that a satisfactory explanation of this occasional occurrence has yet been given.

SARCOMA OF RIB APPARENTLY CURED BY OPERATION AND COLEY'S FLUID.

Dr. Lilienthal presented a man, forty-eight years old, whose previous history was negative, who was under the observation of Dr. Alfred Meyer, of this city, for a number of months for an apparent enlargement of the seventh rib on the left side, in the region of the axillary line. The trouble had existed about nine months, and had commenced with pain and a crackling sound upon palpation over the affected rib. The external mass

had only existed about five weeks. There were no pulmonary symptoms. Since the onset of his symptoms, the man had been failing in flesh and strength. For several weeks he had been placed upon large doses of potassium iodide, but without resulting permanent benefit.

When the patient came under Dr. Lilienthal's observation there was a large, sausage-like mass over the seventh left rib, with distinct fluctuation at one point. A peculiar crepitant sound could also be elicited, which was characteristic of what was sometimes observed in sarcoma of the rib, and which he had also seen in tuberculosis of the rib.

November 15, 1901, an incision was made over the mass, and upon aspiration a syringeful of bloody serum was withdrawn. Upon dissection, it was found that not only the seventh but also the eighth rib was involved, together with the various tissues which covered them. An attempt was made to do a radical operation and extirpate the entire new growth, but this was found to be inadvisable on account of its extensiveness and the firm adhesions to the pleura. The main cyst, over the seventh and eighth ribs, was as large as a small hen's egg; it was lined with a smooth, glistening membrane, and filled with a serosanguinolent fluid. After evacuating this cyst, as well as a smaller one which was located far up in the axilla, a large section of the seventh rib and a part of the eighth were removed, together with a considerable section of the parietal pleura, which was so extensively involved that a total extirpation of the growth was out of the question. The wound was then closed, with drainage at its upper and lower angles, and the patient was sent to bed. He recovered well from the operation, but almost immediately a slight swelling was noticed at each end of the incision, and the man's general health continued to decline. It was then decided to use Coley's fluid, the preparation of Parke, Davis & Co. being selected. He was given five injections of half a minim, which were followed by reaction, and the dose was gradually increased to eight minims, which produced a severe reaction, so that the dosage had to be reduced. The treatment was continued for a period of about eight weeks, and from the very first an improvement in the man's condition was apparent. The signs of swelling gradually disappeared, and the patient's general health improved to an astonishing degree. His present weight was greater

than ever before in his life, and he considered himself perfectly well.

Specimens of the growth which had been submitted to Dr. F. S. Mandlebaum, Pathologist to Mt. Sinai Hospital, for microscopic examination had been pronounced pigmented sarcoma of the fibromyxomatous type. The principal point of interest in connection with the specimens was the infiltration of the sarcomatous tissue by the pigmented cells.

Dr. William B. Coley said that his own experience with the mixed toxins in the pigmented type of sarcoma had not been very satisfactory. Among at least a dozen cases of this kind, he had seen only temporary improvement, and he could recall only one—a melanotic sarcoma of the upper jaw, treated by Dr. George R. Fowler—in which the growth had disappeared entirely, but there was a recurrence after two years.

PYLORECTOMY, WITH WIDE GASTRIC RESECTION.

Dr. Lilienthal presented a Swedish woman, twenty-nine years old, whose present illness began five and one-half months ago with vomiting after meals, at first three times a day, but more recently only once a day, in the afternoon. The vomitus was acid, chocolate colored, and usually not less than a quart at a time. She also complained of heartburn, which was always relieved by the vomiting. Her appetite was excessive. Her bowels were regular; the urine was normal. In spite of the fact that she had lost thirty pounds in weight since last May, her general condition was fairly good, and she had been able to work uninterruptedly.

Upon her admission to the hospital, October 16, 1902, the patient was found to be markedly anæmic; there was considerable enlargement of the inguinal glands, other glands being normal; there was no jaundice; the heart, lungs, liver, and spleen were apparently normal; the abdomen showed a visible prominence in the median line, midway between the ensiform cartilage and the umbilicus. Upon palpation, this proved to be a hard, irregular mass, with a sharp lower edge; it was not tender, freely movable, and could be kept down by pressure.

October 16 the stomach was inflated with seidlitz powder, which resulted in a displacement of the mass to the right hypo-

chondrium. There was always some free hydrochloric acid in the stomach washings; lactic acid was absent. October 21 a median abdominal incision was made between the ensiform cartilage and the umbilicus. Upon opening the peritoneal cavity, it was found that the pylorus and walls of the stomach were extensively infiltrated with a carcinomatous growth, which also involved the first part of the duodenum. There were a few enlarged glands in the gastrocolic omentum, near the greater curvature. The greater omentum was freed along the greater curvature of the stomach and tied by chain ligatures. The lesser omentum and duodenum were also freed, and after clamping the latter, together with the involved pylorus, the tumor was excised. The operation was performed by Kocher's method, about one-third of the stomach being sacrificed. The duodenum was then implanted into the original wound made in the stomach, and interrupted silk sutures applied; these were reinforced by continuous Lembert silk sutures, and the upper half of the stomach wound was closed in the same way. A thin cigarette drain was introduced above and below the suture line. With the exception of a small leak at its upper extremity, the wound healed without complication. Since the operation, the patient had gained thirty pounds in weight. The pathologist reported that the growth was an adenocarcinoma.

LIGATION OF BOTH COMMON CAROTIDS.

DR. LILIENTHAL presented a woman, eighteen years of age. Nine years ago she lost the hearing of her left ear, and began to suffer from a continuous buzzing noise in the left side of the head. The corresponding mastoid was operated on, but no improvement resulted. Two years ago, a double exophthalmus developed, more marked on the left side. The buzzing noise in her head had gradually grown louder, preventing sleep. She also suffered from constant headaches. Her eyesight was unimpaired; there was no diplopia nor goitre.

When the patient was admitted to the Mt. Sinai Hospital, early in November of the present year, an examination of the throat showed that the left tonsil was pushed forward, and posterior to it a large artery could be felt. There was a marked pulsating exophthalmus of the left eye and to a more moderate degree of

the right eye; the pupils were equal and reacted to light and accommodation; the left eye could not be closed. There was a paralysis of the left side of the face. Posterior to and underneath the left ear there was an elongated, pulsating tumor, which became indistinct in the supraclavicular region: it gave rise to a distinct systolic thrill and a loud buzzing systolic murmur. The right jugular vein was prominent and a continuous bruit was present over its course. There was a faint systolic cardiac murmur.

An examination of the left ear revealed a small, rounded tumor of cavernous tissue situated just external to the drumhead, and in both ears the arteries and veins were dilated beyond their ordinary size. In the left ear the veins were almost tortuous in character.

A diagnosis of arteriovenous aneurism, probably in the region of the cavernous sinus, was made, and on November 11 the left common carotid artery was tied. On the following day it was noted that the exophthalmus was less marked and the pulsation of the left eyeball not so pronounced. There was also an immediate disappearance of the tumor underneath the left ear, and this has not returned since. The buzzing noise and the headaches, however, were apparently unchanged. On November 25 the right common carotid was ligated. Both carotids were found to be enlarged, especially that on the right side; its walls were thin, and it presented an anomaly in the fact that it bifurcated very high up. After this second ligation, the buzzing on the right side disappeared completely, but there was still some on the left side. The exophthalmus has markedly diminished and the headaches have practically disappeared. Within the past few days a slight thrill can again be felt on the right side.

PYLORECTOMY FOR CARCINOMA; NO RECURRENCE AFTER TWO YEARS.

Dr. F. Kammerer presented a patient upon whom he had operated for carcinoma of the stomach two years and four months ago. More than one-half the stomach was removed, including the whole of the lesser curvature; the divided ends were then sutured and a gastro-enterostomy done with Murphy's button. Since the operation the man has apparently remained in excellent

health, and there are no evidences of a recurrence. He has not increased in weight, neither has he lost. He claims to be unable to eat meat, but everything else he can digest. He occasionally has a sense of pressure in the region of the stomach. Dr. Kammerer said he had already shown this patient to the Society, about two years ago, in much the same condition as to-day.

THE ESTABLISHMENT OF AN ARTIFICIAL ANUS FOR THE RELIEF OF CHRONIC ULCERATION OF THE LOWER BOWEL.

DR. KAMMERER showed a woman, twenty-eight years old, upon whom he had operated for an ulcerative condition of the upper rectum, sigmoid, and colon by establishing an artificial inguinal anus with a prominent spur, in the right iliac fossa. The nature of the patient's trouble was not apparent. There was no specific history, and she presented no symptoms which could be attributed to syphilis. The trouble had lasted, more or less, for three years. The patient had one healthy child, and had had one miscarriage. There was no tubercular history. The onset of her trouble was gradual. When admitted to the hospital, she was much emaciated; she suffered from rectal tenesmus, with bloody stools, containing mucus and pus in considerable quantity. The lower rectum was free, but beginning some six inches up an ulcerative condition was found with the proctoscope as far as the instrument would reach. The descending and transverse colons were painful to pressure. Antispecific treatment had no effect on her symptoms.

An operation was done May 19, 1902. As soon as the condition of the wound warranted such procedure, irrigation of the lower bowel was practised daily, first with normal salt solution and later on with weak solutions of nitrate of silver, the fluid being introduced into the rectum and escaping by the artificial anus. August 19 the inguinal anus was closed. During the period of treatment, extending over three months, the patient gained about twenty pounds in weight; this improvement has continued, the patient adding another eight pounds to her weight since the definite closure of the anus. She is now in excellent health, and has no pain whatever in the rectum; her bowels move naturally once a day. Dr. Kammerer said he had not made an

examination of the interior of the rectum recently, but it would seem natural to infer that the ulcers, which had healed before closure of the artificial anus, had not since reopened. The speaker said it seemed to him important in cases of this character to establish an artificial anus, and thus prevent any fæcal matter from entering the colon. He was inclined to believe that this was an important point, which could not perhaps be as readily attained by operations not entirely excluding the large intestine from the fæcal circulation.

TRANSACTIONS

OF THE

PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, November 3, 1902.

The President, RICHARD H. HARTE, M.D., in the Chair.

PERFORATION OF AN INTESTINAL ULCER DUE TO TRAUMATISM.

DR. GEORGE G. ROSS reported the case of a man, aged fifty-four years, who, while loading a box on to a wagon, slipped and was struck by the box a slight blow on the lower abdomen. He at once experienced considerable pain, nausea, and vomiting. The pain increased steadily until the time of operation. When admitted to the German Hospital about two hours after the accident, he was profoundly shocked and was suffering great pain. The abdominal recti were rigid and the abdomen was retracted. Rectal examination negative; the flanks were tympanitic, and he gave no positive evidence of hæmorrhage. The tenderness was most marked over the lower half of the abdomen. Peristalsis was absent and he could not pass flatus. Purgative enemata were retained. His temperature was subnormal and pulse weak and running. Four hours after his admission his temperature had risen to normal, pulse 104, pain still severe, and the abdomen had begun to distend.

Median incision six inches long. There was some œdema of the abdominal walls. On opening the peritoneal cavity a sero-purulent, non-odorless fluid escaped, but no gas. The surface of presenting knuckles of bowel was injected and covered in places with flakes of lymph. Throughout the small intestines, small, yellowish-white, pearly bodies were noticed beneath the peritoneal coat.

The entire peritoneal cavity was thoroughly and completely irrigated with warm salt solution, the hand being introduced to

manipulate the fluid and force it into all the pockets of the cavity, beginning below in the pelvis, then each iliac fossa, then beneath the stomach and spleen, and finally under the liver and between the coils of bowel. The small intestine was now withdrawn, and beginning at the ileocecal valve was wiped with gauze. About twelve inches from the cæcum a perforation, large enough to admit a lead-pencil, was discovered. It was situated at the side of the bowel one-third of an inch from the mesenteric attachment. The edges of the perforation were everted, so that the mucous coat of the bowel was protruding through the opening. There was no blood in the peritoneal cavity and the edges looked ulcerated and not torn or lacerated. The opening was nearly round. Peyer's patches appeared normal, and, excepting the perforation, the pearly bodies, and some injection, the bowel seemed normal.

The hole in the bowel was closed by Lembert sutures, the pelvis drained by a glass tube, and several wicks of gauze placed so as to drain the iliac fossa. The convalescence was, on the whole, satisfactory. His bowels moved almost daily, and he passed quantities of flatus. The abdomen remained distended and painful for some days after operation.

Dr. Le Conte was of opinion that, from the characteristics which were found at the time of operation, the case must have been one of perforation due to traumatism, and not to ulceration. The fact that the abdominal wall was thickened and œdematous showed that there must have been considerable contusion; and also the fact that the mucous membrane protruded through the opening in the bowel would seem to indicate that the force had spent itself more on the peritoneal and muscular coats of the bowel than upon the mucous lining. Had the perforation been the result of an ulcerating or excavating inflammatory process, there would have been greater destruction of the mucous coat than of the muscular and peritoneal coats of the bowel.

Dr. William J. Taylor referred to a case which he reported some years ago of rupture of the bowel from the kick of a gun. This occurred while a young man was walking across a marsh hunting for snipe. The gun was accidentally discharged and struck him over the right iliac fossa, causing great pain, and making it almost impossible for him to get to his home, which was some distance away. The accident occurred on Saturday afternoon, and he was brought to Philadelphia on the following

Monday, being first seen by Dr. Taylor about eight o'clock that evening, when he was found to be suffering from a violent general peritonitis. The abdomen was immediately opened, and when a slight adhesion between two coils of gut were separated with the finger, the contents of the bowel poured out. Upon examination it was found that a round ulcer had formed, which had so perforated the bowel that it had become adherent to another coil, and the accidental movement of the finger was sufficient to rupture the slight attempt at repair. The patient died in the course of four or five days.

SPURIOUS MENINGOCELE.

Dr. Henry R. Wharton presented an infant, fourteen months of age, who, when six months old, received a fall, which is said to have resulted in a fracture of the right parietal bone. She was taken to a hospital near her home, and while under treatment there is said to have had a number of convulsions. She was admitted to the Children's Hospital in September of this year, six months after the accident, and presented the following conditions. She presented a fluctuating tumor the size of a hen's egg over the upper and posterior portion of the right parietal bone; the tumor could be reduced to some extent, but became more tense when the child cried, and transmitted pulsation could be detected. There was also noticed marked asymmetry of the face. Examination of the eye grounds was negative. The tumor was tapped and found to contain cerebrospinal fluid. Upon deep pressure a distinct opening in the skull, about two inches in length and one inch in width, at the base of the tumor could be felt with thickened edges.

The case appears to be one of spurious meningocele which has developed after a fracture of the parietal bone; the pathology of the condition is explained by a fracture of the skull, with simultaneous rupture of the dura mater and the effusion of blood beneath the pericranium, causing a hæmatoma which gradually becomes encysted and the subsequent replacement of the blood by cerebrospinal fluid.

The prognosis in these cases is unfavorable, as the tumor gradually tends to increase in size. Various forms of treatment have been employed,—pressure, repeated aspiration combined with

pressure, extirpation of the sac, and closing the gap in the skull by an osteoplastic flap as practised in one case by König.

A spontaneous cure has resulted in some cases, and in early cases compression has been followed by good results. All operative methods of treatment have been followed by a high mortality.

Dr. Wharton said that this case seemed to him to be an unfavorable one for operation on account of the large gap in the skull, and the difficulty of forming an osteoplastic flap of sufficient size to fill the gap.

Dr. De Forest Willard thought that in a case with so large an opening, and probably traumatism as the initial lesion, and with the absorption of the bone which is apparently taking place, any injection operation would be exceedingly unsatisfactory, probably fatal, and certainly not curative. He believed that an excision of the tumor would be followed by failure of reproduction, and that the only operation offering any hope of relief would be an osteoplastic plate covering the bone and giving support after operation. This operation he also felt would be attended by the same risks as any operation of that kind, but as the size of the tumor is constantly increasing and the size of the opening in the skull constantly increasing, he thought that it would be justifiable.

MARJOLIN'S ULCER.

Dr. J. Chalmers Da Costa read a paper on the above subject, for which see Annals of Surgery for April.

Dr. Henry R. Wharton stated that his attention was first directed to this condition by a case which he had seen some years ago in the University Hospital under the care of Dr. Ashhurst, the ulcer occurring in the cicatrix of a gunshot wound received in the War of the Rebellion. The case presented all the characteristics which Dr. Da Costa has enumerated. The ulcer was inflamed and painful, and the discharge therefrom was most offensive. Since that time he had seen three typical cases of Marjolin's ulcer, one of which developed in the cicatrix of a gunshot wound also received in the War of the Rebellion, which came under his care at the Presbyterian Hospital, and in which amputation of the leg was performed. Another occurred in a colored woman sixty-three years of age, being located in cicatrized tissue back of the knee, which had resulted from a burn received at the age of twelve years. A few years previous, when the woman was fifty

years of age, there developed a fungous ulcer. In this case an amputation of the thigh was done. Another case occurred in a woman seventy years of age, who gave a history of an ulcerated leg since she was twelve years of age, which had suddenly broken down, involving the leg to the knee-joint. In this case amputation of the thigh was done. These cases all terminated satisfactorily, and, although some of them have been under observation for a number of years, there had been no return of the disease.

Dr. G. G. Davis stated that if by Marjolin's ulcer was meant any malignant growth following ulceration of the extremities, he felt it was a very remarkable thing that Gross should only have seen three cases in his lifetime. If such was his experience, we would be led to think that these cases are extremely rare. He stated that personally he did not think malignant growths occurring on previously ulcerated surfaces were so extremely rare as this experience of Gross would seem to indicate. He remarked that a few months ago he amputated one leg for carcinomatous growth of the heel following an injury and ulcer which had existed for a couple of years, and he also felt sure that he had seen other cases of this character.

EXTRADURAL HÆMORRHAGE.

Dr. John H. Jopson read a paper entitled "Two Cases of Extradural Hæmorrhage," for which see page 341.

Dr. J. Chalmers Da Costa referred to a case which had come under his care some time since. It was that of a man suffering from an injury to the skull by being hit on the head with a blackjack, after the administration of knockout drops. Incision into the wound revealed a fracture of the skull and extensive hæmorrhage from a parasinoidal sinus, which was controlled by gauze packing. The patient did well for a number of days. Primary union was complete, except there was a very small fistula. Ten days after the operation the patient became violently insane, imagined that he was being beset and prosecuted, had terrifying hallucinations, and became worse and worse. Da Costa then became doubtful as to how many pieces of gauze he had put in the wound. He could not remember how many he put in, but he knew only one piece had been taken out. By means of a small probe he was finally able to secure a thread through the sinus that remained, and then removed a piece of gauze twelve inches in

length. This case indicates the necessity for extreme care in always noting down the number of pieces of gauze put in a wound for the control of hæmorrhage. The speaker referred to the case of a man who was run down by a bicycle fiend. The man was brought into the hospital speechless and suffering from an injury of the scalp above the external angular process on the right side. He was either unable or refused to write, but made curious signs with his fingers, which were found to be the deaf and dumb language. Another inmate of the institution who understood the sign language was brought into the room, and on attempting to converse with the patient, it was found that he only spoke three words, "how," "what," and "when," which he repeated with his fingers. When asked his name, age, residence, how he was hurt, etc., he would invariably make these same signs with his fingers. The man was operated on and a bit of bone was found driven into the third frontal convolution. When the man returned to consciousness, his wife, who was also deaf and dumb, was there, and he conversed with her with perfect freedom, and the question has presented itself to the mind of the speaker whether the sign language was located in the third frontal convolution on the right side, as seems to be indicated by this case of aphasia to signs, as it might be considered.

Dr. John H. Jopson stated that he believed the method recommended by Dr. Neilson, of controlling the hæmorrhage by means of the ligature, was the best in the cases where it could be practised; but in the first case this was absolutely impossible, as several of the branches of the vessel were apparently torn, and a considerable amount of packing was required. In the second case, a very little packing checked bleeding most satisfactorily, and more bone would have had to be removed than was done to have used the ligature method.

As to the possibility of the production of hæmorrhage without fracture, he believed that that point had been emphasized by Jacobson. As long ago, however, as the time of Charles Bell, he pointed out, if you take a cadaver and strike it a heavy blow on the skull and then inject the carotid artery, you can find evidence that the dural artery or its branches has been ruptured.

The question of the removal of the clot was considered an important one, and it was recommended that an opening should be made in the skull of sufficient extent to thoroughly uncover the

seat of the hæmorrhage, reference being made to a case in which a trephining operation had been done, the clot syringed out, but the true source of the hæmorrhage never uncovered or controlled, and death resulted from further compression of the brain.

Dr. Henry R. Wharton stated that in his opinion one point which should never be lost sight of in these cases of extradural hæmorrhage was that where the typical symptoms might be located, the hæmorrhage might be from another source, as for instance the symptoms occurring in the right side when the hæmorrhage was in the lateral sinus. He reported the case of a boy who fell some distance and struck the right side of the head, and within twelve or fifteen hours developed typical symptoms of extradural hæmorrhage. Following the external symptoms, a trephining operation was done, including the small fissure of the skull, which was followed backward until the seat of the hæmorrhage was found and an immense clot of blood removed. The hæmorrhage was controlled by packing, and the patient ultimately recovered. In suspicious cases it was thought to be always well to bear in mind the possibility of the lateral sinus being the seat of the hæmorrhage.

Dr. Taylor stated that in one case which he had reported, a man had been standing at the head of a stairway down which he fell. A history was given of his unconsciousness for a short time, that he recovered sufficiently to get up and walk into a room and sit down, but that in a few minutes he became again unconscious and was sent to the hospital. When first seen he was apparently paralyzed on one side, and had convulsive movements on the other. As he had only one eye, it was impossible to compare the pupils, but his single one was contracted. A trephine opening was made in the skull on the opposite of the paralyzed side in the region of the anterior branch of the middle meningeal artery, but no clot whatever was found. Immediately another trephine opening was made on the opposite side of the head at a corresponding point, and a large extradural clot was discovered. Evidently this clot had produced sufficient irritation to the dura to cause the convulsive movements. The man never regained consciousness and died. It was now learned for the first time that he had been paralyzed on one side some time before the accident, and at the autopsy an old blood-clot was discovered on the brain. The question of diagnosis was here very much complicated by the conditions and by a faulty history.

Dr. G. G. Davis stated that it was interesting to bear in mind, in reference to the cases of extradural hæmorrhage not from the middle meningeal artery, that they can take place without any fracture being present. He had been inclined to doubt the possibility of this occurrence, but referred to a case which was reported in the *New York Medical Journal* three or four years ago, in which a surgeon diagnosed and evacuated a clot in one of the parietal regions, in which there was absolutely no evidence of a fracture. Since that time he has seen the record of another case in one of the British journals, which would seem to establish the possibility of the occurrence of this condition beyond a reasonable doubt.

Dr. T. R. Neilson stated that he had a number of times to control hæmorrhage from the middle meningeal artery or its branches. He felt that packing by means of gauze is best adapted to intracranial hæmorrhage from the venous sinuses, as he had proven by personal experience on a number of occasions. In hæmorrhage from the middle meningeal artery his practice has been to control it by ligature, not tied over a hæmostatic forceps, but passed around the vessel threaded in a small, full curved needle. Reference was made to a case in which he had found it necessary to plug the foramen spinosum in order to control the hæmorrhage, the vessel being torn across as it emerged from the foramen. The plug used was a match-stick sterilized by boiling. In reference to the removal of clot, he stated that he believed it could be done more easily and more quickly by means of a stream of water from a syringe than by any instrument.

A HOLLOW BONE-DRILL.

Dr. J. Torrance Pugh presented a bone-drill which he thought would obviate the necessity of groping about with a wire to find the hole made by it.

It is made in four parts, viz., a straight handle which has a hole running longitudinally through the centre; the "bit," which also has a hole drilled through it lengthwise and coming out about one-sixteenth of an inch from the lower end on one of the grooved sides; a set-screw, to hold the bit in place; and a trocar to close the lower opening, and so prevent the lumen of the canal from being choked with bone chips. A short screw-thread holds the trocar fixed in its position.

After the parts are put together, the drill is pushed through the bone, the trocar is withdrawn, and the silver or other wire pushed through the centre of the drill and caught on the other side of the bone. The drill is then withdrawn on the wire, the

Hollow bone-drill.

trocar again inserted in its proper place, and the bone drilled on the other side. The trocar is then withdrawn, and the end of the wire inserted into the opening in the one side of the drill, and as the drill is withdrawn, the wire is pushed through with it and follows it, as it were.

The hole cannot clog or choke with bone-borings because of the trocar, and this most troublesome feature of all such instruments is thus overcome.

A TWIST DRILL BONE-NEEDLE.

Dr. H. Augustus Wilson exhibited a twist drill bone-needle which is an ordinary twist drill of commerce with an eye made in each end. It may be used like an ordinary needle or by means of the eye in the point by being passed through the bone, the suturing material inserted in the eye and withdrawn. To facilitate

Twist drill bone-needle.

the use of this bone-needle, a jeweller's vise was shown which is made with a hollow handle, so that the suturing material may be in place ready for use. This vise is readily sterilized. The twist drill bone-needle has the advantage of making a very small hole in the bone, which is necessary in suturing the smaller bones, for instance, the clavicle. By means of this needle any suture material can be employed.

Stated Meeting, December 1, 1902.

The President, RICHARD H. HARTE, M.D., in the Chair.

HIP-JOINT AMPUTATION FOR TUBERCULAR DISEASE OF THE FEMUR.

DR. DE FOREST WILLARD presented a woman, fifty years of age, who was admitted to the Presbyterian Hospital, October 21, 1902, with the history that for forty-two years she had had tubercular ostitis of the left femur,—first at knee, then thigh, then hip. Numerous sinuses had formed from time to time at various points in the thigh, sometimes healing, then reappearing. One year ago she fell, and either broke the femur at lower end or tore the ligaments at the knee, so that the leg now bends outwardly at an angle of forty-five degrees to the femur; limb perfectly useless. Pus discharging sinuses at various points between knee and hip-joint. Increased pain and discomfort both at lower and upper ends of femur. The tissues throughout the entire thigh dense and indurated from tubercular deposit. Knee-joint rigidly fixed. As the limb had been useless for years, and as there was no possibility of her ever employing it for locomotion except with crutches, the patient readily consented to a hip-joint amputation.

Operation.—Three Wyeth's pins used, anterior one entered below anterior superior spinous process, and emerged near the vulva, passing close to pubic ramus and beneath femoral vessels. Around the head and point of this pin was carried ovally an elastic tubing, thus compressing the femoral vessels independently of the encircling tubing, which was afterwards applied. The anterior flap was made irregular in shape to avoid the pus sinuses; the femoral vessels were tied with catgut before disarticulation of the joint; posterior flap also cut and vessels tied, as the tissues were densely infiltrated. Upon removal of the tourniquet, less than one drachm of arterial blood was lost, the only hæmorrhage being the venous blood in the leg itself, which, on account of the pathologic conditions, had not been pressed out by elastic bandage. Wound closed with silkworm gut, posterior drainage being provided for by an independent opening through the buttock.

Animal heat had been economized during the operation by

placing the patient upon an electrically heated mattress, and by her body having been wrapped from neck to feet in cotton wadding. She left the table with a temperature of 99° F. Whiskey and water enemas had been given just previous to the operation; also, hypodermics of strychnine and morphia.

Her operative recovery was retarded, as the wound became infected from the old pus sinuses, which delayed the healing. The blood supply for the body was abundant, as the circulatory system was relieved of one-sixth of its requirements.

SPINA BIFIDA.

DR. WILLARD presented a girl, aged seventeen years, height four feet eight inches, fairly well developed, who was admitted to the Presbyterian Hospital, October 9, 1902, with a history that since infancy she had been unable to walk without apparatus or crutches. History vague, but, as far as she could remember, she had been operated on six times for correction of feet and leg deformities.

At time of admission she had trophic ulcers on the soles of the feet, and bore the scars of several tenotomies; also on the right foot the scar of a probable wedge-shaped excision of the outer side of the tarsus. The right foot, however, still presented a bad talipes varus. Foot very short and stumpy and incapable of bearing weight. Left foot markedly valgic, so that the inner malleolus came close to the floor. The great toe had been removed for trophic changes or necrosis. Legs and thighs feebly and illy developed. Sensation markedly absent, so that operations on the foot have been done without ether, yet without the patient complaining of any pain. Legs incapable of bearing weight of body without support of hands or of crutches. Muscular contractility very feeble in left leg, moderate in right; had control of bladder and rectum.

The appearances were indicative of a lack of nerve supply from a spina bifida, and upon examining her back a large, soft swelling, resembling a fatty tumor, was found over the sacrum; in its centre was a marked dimple, but the tumor did not project like an ordinary spina bifida, but was flattened out like a saucer, and while four or five inches in diameter was not elevated more than an inch, being spread out over the sacrum. A very slight depression could be felt over the spinal canal, but no large open-

ing could be discovered, and pressure upon the tumor gave no pain, headache, or discomfort to the patient. There was no abnormal growth of hair over the region.

As there had been a previous unsuccessful wedge-shaped tarsectomy, the astragalus of the right foot was removed in order to allow the member to be brought into a straight position, with the sole well down upon the ground. No anæsthetic was required, and the patient complained of no pain. Catgut drainage and catgut sutures were employed, and foot dressed with plaster of Paris. In the left valgic foot the tendon of the peroneus longus was divided, and an osteotomy of the fibula performed one inch above the malleolus. The foot was then forcibly inverted and confined in this position by a gypsum dressing. The bandages were not removed until the end of the fifth week, when the wounds were found perfectly healed. The right foot was in such good position that it will probably not require apparatus, but the left will need a valgic support at the inner ankle. The limbs are so feeble from their lack of nerve supply (a portion of the cord having probably been lost in the tumor) that she will require the assistance of crutches, at least for a time.

As the opening in the spinal canal had apparently closed, there seemed to be no benefit to be secured by operative treatment upon the spina bifida occulta.

GUNSHOT WOUND OF FOREARM.

Dr. Willard presented a boy of fourteen, who had been injured by discharge of a shotgun at close range. The entire upper middle region of the right forearm was torn away, leaving only the ulna. About four inches of the radius were destroyed, together with the radial and interosseous arteries, the radial and median nerves, and the entire muscular and tendinous structures. The ulnar vein was also wounded and a large branch of the ulnar artery also injured.

At first sight it seemed that an immediate amputation was necessary, but from past experience, knowing the recuperative power of the adolescent, and with the fact that a hand and forearm even though rigid and distorted are more serviceable for work than an artificial member, it was decided to attempt to save the arm. Many shot were removed; the area sterilized; torn tendons and nerves were united as far as possible. The question of

immediate excision of the ulna to accommodate its length to that of the destroyed radius was considered but abandoned, since the excision of four inches would have so folded what was left of the ulnar circulation, that it would certainly have impeded the slight remaining current. The arm was put upon a splint with thorough antisepsis. Patient was critically watched for the next week. The hand became very black, but no blebs appearing, amputation was deferred from day to day. The result at time of report, four weeks after the injury, is that no area has become acutely gangrenous, but there has been a dry, hardening gangrene which is now limited to the tip of the pulp of his little and third fingers and the last phalanx of the thumb. An amputation of the latter member will give him one phalanx of the thumb, which with even stiff fingers will prove very helpful, even if but slight motion is secured, and though the hand and arm will necessarily be very useless, yet will answer for many kinds of work. As the boy still has several years of growth before him, it is probable that the elongation of the ulna will distort the arm, but a future resection of the bone can readily be done when needed, and if trophic changes occur from destruction of nerves, an amputation in the future will leave him no worse than would have been the case had an operation been done at once.

SIMULTANEOUS RUPTURE OF BOTH QUADRICEPS EXTENSOR FEMORIS TENDONS.

Dr. Henry R. Wharton presented a man, aged sixty years, who, in stepping from a trolley-car on the evening of June 12, 1902, alighed upon a pile of sand and experienced a sense of something giving away in the knees. He did not fall at the time, but when he attempted to walk, fell, as the limbs seemed powerless. He was removed to his home and was examined by his family physician, who found the knees greatly swollen, with marked disability as regards extension of the knee-joints. He was treated by fixation of the knee-joints and the use of evaporating lotions; but when the swelling had subsided it was found that there was no improvement in the power of extension of the knees. Dr. Wharton saw the patient in consultation with his family physician on July 12. Upon examination, a marked depression over both quadriceps extensor tendons, about one and a half inches above the patella, was evident in each limb. There was at this time

complete loss of the power of extension of the knees. A rupture of both quadriceps extensor tendons had occurred, and there had been no attempt at repair under fixation of the joints.

The patient was removed to the Presbyterian Hospital, and on July 21, after careful preparation of the limbs, a longitudinal incision, four inches in length, was made over the position of the rupture in each tendon, and the ruptured ends of the tendons were exposed about one and a half inches above their insertions into the patella. The gap between the ruptured ends of the tendons in each case was filled with a blood-clot and synovial fluid. The bursæ above the patella were ruptured, and a portion of the blood-clot extended under the patella and into the knee-joints. The ends of the tendons were freshened, and in accomplishing this it was observed that there were bony deposits in the tendons, which was probably a predisposing cause to their rupture. The blood-clots were carefully removed, and after freshening the ends of the tendons the surfaces were brought into contact by the introduction of four heavy chromicized catgut sutures. Some force was required to bring the edges in contact, on account of the gap which existed. The most scrupulous care was exercised as regards asepsis during the operation. The fibrous tissues over the tendons were brought together with buried sutures of fine catgut, and the external wounds were closed with silkworm-gut sutures without drainage; a sterilized dressing was applied, and the limbs were enclosed in plaster-of-Paris dressings extending from the toes to the groin.

The patient ran a perfectly satisfactory course after the operation, with scarcely a rise of temperature above the normal. The bandages were trapped on July 31, ten days after the operation, and, as the wounds were healed, the sutures in the external wound were removed. The plaster bandages were removed on August 9, and the union in the tendons at the seat of operation was found to be firm. Plaster bandages were reapplied and remained for two weeks, and were then removed, and a pair of laced knee-caps applied. The patient was then gotten out of bed and allowed to walk with crutches. He was soon able to walk with the use of a cane only, and rapidly regained the use of the limbs. By October 15 he could walk without any artificial support, and the restoration of function was complete.

Dr. W. Barton Hopkins recalled a rupture of the ligament

of the patella that he met with some years ago. The injury was the result of muscular violence, and the patella was found to be drawn up the thigh at least five inches above its normal position. The patient was admitted to the Episcopal Hospital a few hours after being injured, and was immediately operated upon. The patellar ligament was found to be ruptured and the patella entirely denuded of its periosteum and dragged up the thigh The tendinous covering of the bone was left attached to the tendon above. The wound healed perfectly and functional restoration was complete. Dr. Hopkins said that rupture of either the ligament of the patella or the tendon of the quadriceps is interesting because of the greater frequency of fracture of the patella when the structures in question are subjected to a breaking strain. During his experiments to determine the tensile, transverse, and crushing strength of bones, he found that the patella resisted a tensile strain of 1845 pounds, when the ligament parted. The pull was a steady, straight one, however, with no tendency to flexure of the joint or to impact upon the bone which is often present in cases of fracture. The tendon and ligament during the experiment were attached by straight iron clamps so arranged that crushing was avoided. The ligament parted at a point some distance from the clamp, showing that the instrument had no part in producing the rupture. In all cases of ruptured tendons or ligaments, operation, in his opinion, is the only method of cure, and should be performed as soon as practicable.

RETRACTOR OR ELEVATOR FOR OPERATIONS UPON THE BASE OF THE BRAIN.

Dr. Charles H. Frazier presented an elevator for use in operations at the base of the brain. He said that only those who have had occasion to approach structures at the base of the brain realize how necessary it is that the operator, at least, should be afforded an unobstructed view of the structures, and how difficult it is in many cases to secure proper exposure. Two factors interfere with the surgeon's view of his field of operation,—hæmorrhage and the brain itself. Hæmorrhage can be controlled by pressure applied through strips of iodoform gauze. The brain must be elevated or retracted, and in such a way as to cause the least degree of compression and contusion to the cerebral tissue, and avoid laceration to the dura should that structure be still

intact. In his operations upon the sensory root of the Gasserian ganglion he had been hampered by having his view wholly or partially cut off and his manipulations interfered with by the hand grasping the retractor, whether it be the hand of the operator or the hand of an assistant With a view towards removing this obstacle or annoyance, he had had constructed by the Valzahn Company of Philadelphia a special retractor (see figure). Its important features were the shape and the thickness of the blade. For a distance of three centimetres from the handle the axis of the blade forms with the axis of the handle an angle of 145 degrees, so that when the instrument is in use the hand grasping the retractor is so situated as not to interfere between the surgeon's eye and the field of operation. The remainder of the blade is eight centimetres long, follows a curve very slightly concave

Brain elevator.

except at the tip, where the curve is a little more exaggerated. The blade is thin enough to yield somewhat under the pressure that would be exerted upon the dura and brain, and thus adapts itself more or less evenly to the surface to which it is applied, and thereby subjects the brain to a uniform degree of pressure. This retractor or elevator may be used in any operation which requires an exposure of the base of the brain, whether it be one for removal of tumors or for the extraction of the ganglion or division of its sensory root. It is more particularly with the latter class of cases that he had employed the instrument and found it so useful.

The other instrument shown in the illustration above the retractor is a hook which he had had constructed for his operations upon the sensory root of the Gasserion ganglion. After the root is exposed, it is picked up with the hook, grasped with hæmostatic forceps, and divided.

TRANSACTIONS

OF THE

CHICAGO SURGICAL SOCIETY.

Stated Meeting, December 1, 1902.

The President, JOHN B. MURPHY, M.D., in the Chair.

CARCINOMA OF THE LARYNX.

DR. ARTHUR DEAN BEVAN presented a man from whom five months before he had removed a carcinoma of the larynx by the method suggested by Keen, of using no tube during or after the operation, making a complete removal of the larynx, bringing the trachea into the wound, and stitching it in that position. The man has since learned to talk so that he can make himself understood at a distance of eight or ten feet, and he is improving rapidly in his method of speech without any larynx. The speaker was convinced that, after a more careful study of these cases, it was by all odds better to allow these patients to learn how to talk without an artificial larynx.

REPORT OF SIXTY CASES OF ACTINOMYCOSIS.

PROFESSOR R. VON BARACZ, of Lemberg, Austria, read a paper with the above title, for which see page 336.

DR. WILLIAM T. BELFIELD said that soon after the discovery of the ray fungus, he was in Vienna, in 1882, and saw cases of actinomycosis there, and soon after returning to this country he was called upon by the Health Commissioner of Chicago to investigate the nature of certain diseases of cattle at the stock yards, which he did, and found it to be actinomycosis. He thought this was the first recognition of the disease in this country. Soon after the first case of actinomycosis in the human subject in this country was recognized by Dr. J. B. Murphy.

Dr. John L. Sawyers, of Centreville, Iowa, had reported some eight or ten cases of actinomycosis which had come under his

observation, and had drawn attention to the value of subcutaneous injection of weak solutions of iodide of potassium. The iodides had long been used by various Continental surgeons, and hypodermic injections had been used by Rydygier, among others. Sawyers in one case had really cured a case of actinomycosis of the lung by the intrapulmonary injection of weak solutions of iodide of potassium, something like one grain to the ounce. He had not seen this method of treatment recommended by others.

Dr. A. J. Ochsner described a case which he first saw in 1886, at which time the disease appeared in the upper jaw. The cavity was curetted and treated with iodine and iodoform gauze packing. After the patient had recovered from the actinomycosis of the upper jaw he went to Texas, and after a few years died, probably of actinomycosis of the lung.

He had used iodide of potash in a number of cases of actinomycosis before investigating the manner in which veterinary surgeons use it in cattle, and then he learned that, so long as no abscess had formed, the iodide of potash in cattle, if used properly, would almost surely effect a cure. The manner in which it was administered was very simple. The animal was given a large dose of iodide of potash for a number of days in succession in food; then an interruption of three weeks is made, and a large dose given again each day for three successive days; then another interval is made, after which another large dose is given as before. In one case of actinomycosis of the cheek which had extended upward and had dissected away the ear and one-third of the scalp, he used the iodide of potash in reasonable doses, up to thirty grains three times a day for a period of one month, without the least benefit. There was advancement of the disease, and it was thought that further operation would be necessary; but, profiting by the experience of veterinarians, he put the patient on ninety grains of iodide of potash three times a day for four days, then allowed him to go three weeks, at the end of which time the dose was repeated, and the patient had been well for eight years. So long as there was no abscess present, these patients invariably recovered. As soon as there was abscess existing, the conditions were entirely different. He had observed four or five cases corresponding to the case which Professor Fütterer demonstrated before the Society on a previous occasion, the patient having apparently recovered, but there was a recurrence of the disease,

followed by death. At the autopsy an abscess was found filled with actinomyces. The difficulty in this case was a location in which the actinomyces could remain reasonably safe from the effect of the iodide of potash. In this case, too, there was an empyema. At the time of the operation there was actinomycosis of the colon, which had entirely healed, but the cavity containing the actinomyces had started the disease again. After taking these remedies in the manner mentioned, the patient remained apparently well for nearly a year. He did not remember the exact facts, but they were on record. And so it happened with the other cases in which there was a place where the actinomyces could remain away from the circulation, in which the iodide of potash was carried; so that in his experience the disease had disappeared by giving patients ninety grains of iodide of potash, three times a day, in milk, followed by a pint of hot water. The patients would take it well for three days, then they were allowed to go without it for four days. The dose was repeated a number of times at intervals. Under this method of treatment he recalled a number of patients who had been well for a considerable time, one since 1892.

In intestinal actinomycosis, if one depended upon the iodide of potash, he obtains much better results than by making a radical operation. For instance, he had a patient in mind with severe actinomycosis involving the entire appendix, together with the surrounding tissues which were adherent to each other. It was an acute attack of appendicitis apparently, but the child had had the actinomycosis for a long time. The acute attack was simply an obstruction due to the accumulation of infection of the surrounding tissues. In opening the abdomen he came down upon a mass of actinomycotic tissue, washed it out with tincture of iodine, tamponed with iodoform gauze, gave the child the regular treatment of iodide of potash, and it had been well for four years. Cases of actinomycosis involving the small intestine in which a radical operation was made were liable to die of starvation because of the incurable fistula which usually occurs.

Dr. Arthur Dean Bevan asked whether there was any possibility of the X-ray being of service in cases of actinomycosis. A somewhat similar condition was blastomycetic dermatitis, in which iodide of potassium was of great value, and yet it had recently been demonstrated that the X-ray was a valuable adjunct

in treatment, that is, a combination of the iodide of potash and the X-ray had resulted in cleaning up cases of blastomycetic dermatitis more rapidly than any other mode of treatment. While he had never used the X-ray in actinomycosis, he thought a combination of the iodine and the X-ray might be worth trying.

Dr. Ochsner stated that in one case of actinomycosis of the upper jaw he had used that form of treatment, and in a short time the patient became well, and it was now over a year that he had remained so.

Dr. Malcolm L. Harris stated that during the past summer he had had a case under observation in which the abdominal wall was involved, the disease having started apparently in the prevesical space. The patient was a young man. The disease appeared first as a slow-forming abscess; the abscess was opened, cultures were made, and the staphylococcus albus obtained. There was a very small amount of pus, with a large amount of hard exudate, and in the pus were little granules which, under the microscope, proved to be actinomyces. He had, therefore, in this case a mixed infection. As soon as the actinomycosis was recognized, the patient was placed on the iodide treatment, both internally and locally. The condition, however, progressed, the disease extending about the abdominal wall up as far as the umbilicus and laterally to the inguinal region. No apparent improvement was noticed from the iodide, although he gave it in very large doses continually. The patient was then given daily treatments with the X-ray, the iodide being used internally and locally at the same time. Some of the hardness of the abdomen seemed to disappear after two or three weeks of treatment with the X-ray; but the general condition of the patient constantly declined. He was under treatment between four and five months, the diseased area extending with the use of the X-ray and the iodide. The patient was then removed from the hospital, and he lost sight of him. From the steady onward march of the disease, he did not think the patient could live a great while.

Dr. William E. Morgan within the last year or two had seen three cases of actinomycosis, one of which was appendiceal, which he was enabled to follow to the end and succeeded in getting a very thorough post-mortem examination. Under enormous doses of iodide of potassium, running them up as high as 360 grains in twenty-four hours, and continuing, not only for

days, but weeks, without any apparent improvement. The man finally died of general marasmus. The notable thing that impressed itself more on his mind than any other one feature in this case was the marked anæmia, and yet, when it came to examining the blood count, he found it almost normal at all times.

In the other two cases of actinomycosis which he had seen within the last twelve months, both began in the mucous membranes of the lower jaw, and subsequently involved the neck. One of them was now under his observation, but would very soon succumb to involvement of the lung, which became very early implicated. Of these three cases, two had fistulæ, and he supposed all of them had what might be considered abscesses, because they had fistulæ. There was softening and breaking-down, so that there were cavities as large as a peanut, and in the deep muscles of the flank in the lumbar region there was one spot as large as a hickory-nut, where there was a great deal of softening. In the neck cases both had fistulæ, one fistula opening directly into the mouth.

His experience with iodide of potassium in these three cases had been disappointing. In the abdominal case he was impelled to use the X-ray to some extent, but not a great deal, as the patient complained of increase of pain following X-ray treatment, which was contrary to the use of the X-ray in other tumor formations. After each sitting the patient was in great distress for twenty-four hours.

Dr. Edward H. Ochsner had had occasion to look up the literature of this subject, and found it very meagre on three very important points. The first point he mentioned was that whenever there was secondary infections, the prognosis was much worse; that whenever there was a likelihood of repeated secondary infection it was still worse. In actinomycosis of the intestinal tract and of the lung this was a constant recurring danger. There was a constant repetition of secondary infections of various kinds. He thought this was one reason why actinomycosis of both the intestinal tract and of the lungs was generally fatal, and it was a point from which a lesson could be drawn. It was just as important to do an operation upon the actinomycotic area with the greatest asepsis and care as it was to do a laparotomy aseptically, because, if the patient was treated aseptically during the whole period, the chances for recovery were greatly increased.

Another point was the necessity of interrupted iodine treatment. He did not know exactly why this made a great difference, but it certainly did so. If the iodine treatment was interrupted, the actinomycotic areas became again pervious to the blood current, and in that way the actinomyces were killed.

A third important point had been alluded to by his brother, namely, the importance of seeing that there are no abscesses which the blood current, containing the potassium iodide solution, could not get at. If abscess existed, there would constantly remain particles of infected material in the centre, to which no potassium iodide in solution in the blood could reach, and consequently there was continuous reinfection. If these abscesses could be opened and treated aseptically, then the chance for recovery was excellent. If they could not be gotten at for some anatomical reason, or were overlooked, the case would terminate fatally.

Dr. Von Baracz urged the members to try the treatment he had recommended, namely, injections of nitrate of silver. In one case of not extensive actinomycosis of the cheek he injected only one grain of the solution by means of a Pravaz syringe, and it cured the patient. He mentioned one case that was cured by two injections, and another by three injections.

As to injections of tincture of iodine, he used small doses, say about two grains, of the pure tincture of iodine, but a cure could not be effected so promptly.

As to the treatment of cases of actinomycosis of the lungs, he might try the method recommended by Credé in cases of septicopyæmia, which consists in the intravenous injection of colloid silver (collargol), as the great value of nitrate of silver in actinomycosis was already known.

With reference to the injection of iodide of potash, referred to by Dr. Belfield, he said this treatment was recommended in cases of actinomycosis some ten years ago by a foreigner.

FIBROMA OF THE OVARY.

Dr. D. W. Graham reported a case of fibroma of the ovary. The patient was thirty-eight years of age; single. She had been in poor health for the last two years; bedridden for the last six months; no menstruation for two years. A tumor of the pelvis was discovered one year previously, which had gradually enlarged. Physical examination disclosed a large, hard, somewhat movable

tumor in the lower abdomen with considerable ascitic fluid. Normal cervix and normal uterine cavity.

Operation, October 31, 1900. A large quantity of straw-colored fluid escaped. Tumor globular and as large as an adult head. Intimate and extensive adhesions to the sigmoid colon, the pelvic brim, and the left iliac fossa. Tumor was attached to the right broad ligament and Fallopian tube, from which it was ligated off. No pedicle. In separating adhesions from the sigmoid, a rent was accidentally made, through which some fæcal matter escaped during the operation. The mesosigmoid seemed to be wanting, or was spread out over the tumor. The left ovary was hard and atrophied; uterus was normal in size, movable, and had no connection with the tumor. Two or three small fibroids were situated on the posterior surface of the uterus. Tubular drainage. Patient died on the fifth day after operation. Post-mortem examination showed an acute fibrinous purulent peritonitis, with a necrotic opening in the wall of the sigmoid corresponding to the adhesions. The slough of the sigmoid wall with the consequent leakage and peritonitis is sufficiently accounted for by the destruction of the mesocolon and the arterial supply of the bowel wall during the operation, although all proper effort was made to repair the damage and to supply peritoneal covering for the extensive rawed surface. Probably exsection of the loop would have given a better result.

Dr. Hektoen's note on the tumor says, "On section, an irregularly arranged anastomosing-outbranching system of glistening fibrous bands was observed, surrounding in places yellowish gelatinous areas." Microscopical examination showed true fibroma. No traces of ovarian tissue were found.

Dr. Reuben Peterson, of Ann Arbor, Michigan, had recently published a paper in which he had analyzed eighty-four cases of fibroid tumors of the ovary, eighty-two of this number having occurred in the practice of others, and two in his own practice, which were recently operated upon. His statistics show that the average age of patients with fibroma of the ovary is somewhat less than the average for patients with fibroid tumors of the uterus. The largest number in the eighty-four cases were between the ages of forty and fifty; the next largest between thirty and forty; the next between twenty and thirty.

As to ascites, the analysis of Peterson shows that about 40

per cent. of cases of fibroma of the ovary have considerable ascitic fluid, as was also found in his (Dr. Graham's) case. Dr. Senn in his work on tumors reported two cases, and mentioned ascites as a diagnostic sign as between fibroma of the ovary and fibroma of the uterus.

The question as to what caused the ascitic fluid in such a large proportion of cases was not definitely or satisfactorily determined; but it was stated that the probable cause was the movement of the tumor in the abdominal cavity.

In the speaker's case, and in some others he had investigated, the tumor was more or less fixed. He thought it would be found that the tumor was fixed or partially so in as great proportion of cases of fibroma of the ovary as it would be in fibroma of the uterus.

As to the differential diagnosis, there was no way of determining before operating whether one had an ovarian or uterine fibroma to deal with, in the majority of cases; certainly not where the tumor was as large as in this case, and adherent.

UTERINE FIBROMA.

DR. GRAHAM showed this specimen in connection with the first one, the chief peculiarity being the very large, long cervix with a sessile, submucous tumor the size of a hen's egg attached to the posterior cervical wall near the internal os. The body of the uterus showed two intramural tumors half as large as that in the cervix, and a number of smaller ones. The patient, aged thirty years, a nullipara, sought operation on account of excessive persistent hæmorrhages. When the specimen was fresh, it seemed to show the site of the hæmorrhages to be at the upper border of the cervical tumor just without the internal os. An abdominal hysterectomy was done, as the operation of choice, for want of room by the vaginal route.

SACCULATED BLADDER.

DR. GRAHAM reported the case of a physician, over seventy years of age, who had been using a catheter at intervals for a number of years. The patient would often pass the catheter without being able to withdraw a drop of urine. He had passed the catheter for him at times and could not obtain any urine, yet the patient would be satisfied that his bladder was full. At such

times, after waiting and walking around for a few minutes, the reintroduction of the catheter seemed to act as a stimulus, and as much as a quart of urine would be passed at one time, even though the catheter should be immediately withdrawn. The condition of things was not clear until after the death of the patient, when an examination of the bladder was made, and the bladder cavity found very small, its walls very thick and dense. It had the appearance of a uterus almost, and was not much larger. In the posterior left wall of the bladder was an opening about the size of a lead-pencil, as if punched out. When dissection was made, a large pouch was found behind the normal bladder, filling up the pelvis.

APPENDICITIS FOLLOWED BY SUPPURATIVE PYLEPHLEBITIS.

DR. GRAHAM described a case of appendicitis operated on the fifth day after the onset of the disease. The abscess was of the usual type; the appendix was removed, and drainage resorted to. Patient improved for a few days, but pulse did not become normal. It continued high, varying at first from 100 to 120, and later from 120 to 160, with all the characteristic symptoms of pyæmia. In the course of three or four weeks the patient had pain in the left hypochondriac region. The left pleural cavity was explored for purulent fluid, but none was found. The liver was explored with an aspirating needle, and no fluid found. He had suspected suppurative thrombophlebitis of the portal veins, with abscess of the liver, when the patient's condition failed to improve. Patient died in about ten weeks from the time of the operation.

At the autopsy a part of the liver and a part of the spleen were obtained. The spleen was found to be extensively necrotic, and in a suppurative, gangrenous condition. There was no abscess of the liver, but he could squeeze out pus from the branches of the portal veins on the liver section. It was a typical case of suppurative thrombophlebitis of the portal veins, extending up into the liver and indirectly to the spleen, without distinct abscess formation in the liver. Statistics showed that about 4 per cent. of the deaths from appendicitis were due to this cause.

LARGE CARBUNCLE.

DR. GRAHAM presented a large carbuncle which he had excised in its entirety. He exhibited it for the purpose of empha-

sizing a method of treating carbuncles which was advocated by him in a paper ten or twelve years ago. Every case of carbuncle that had come under his care he had extirpated just as he would extirpate a tumor, a gangrenous appendix, or a gangrenous limb. If this method were pursued in every case of carbuncle and in the early stage, the surgeon would prevent much trouble, and no patient would die of the disease. If one waited for a carbuncle to slough, an enormous wound would be left, with a long convalescence, even if the patient escaped fatal septicæmia. The proper way to treat a carbuncle is to make a crucial incision beyond the periphery of the tumor, turn back the four flaps and remove the mass as a whole. No one would hesitate to do this if it is recognized that the periphery is the active, aggressive part of the disease, and that the tension of the dense, overlying tissues is the chief factor in spreading the infection. If it is good surgery to amputate a gangrenous limb instead of waiting and watching it slough off and the stump cicatrize by nature's processes, by the same token it is good surgery to make a radical, complete extirpation of every carbuncle as soon as the diagnosis is made instead of temporizing and tinkering with, or even curetting out, the central slough.

LEFT-SIDED SUBPHRENIC ABSCESS.

Dr. Daniel N. Eisendrath reported a case of left-sided subphrenic abscess. The case was admitted to the service of Dr. Greensfelder at the Michael Reese Hospital, August 14, and was operated on for appendiceal abscess. Patient did well for a few days, then symptoms of infection began to manifest themselves. Temperature continued high, and the patient was apparently in the midst of another infection of appendicitis. The abdomen was reopened; the appendix was removed, and it was thought that the temperature would now decline, but in spite of that sepsis continued. The speaker took charge of the surgical service on the first of September, and found the patient septic. The leucocyte count was 21,000. In looking for the source of the sepsis, he found an area of dulness over the lower lobe of the left lung, inserted a needle, and withdrew fœtid pus. He entered the pleural cavity, but found an abscess situated below the left dome of the diaphragm. He opened the abscess by the transpleural method. The abscess was situated between the spleen and left lobe of the

liver and below the left dome of the diaphragm. For a few days thereafter the septic symptoms disappeared, but recurred again, and the patient died about two weeks after operation. An autopsy was not permitted.

This was the second case that had been reported of left-sided subphrenic abscess. The first case was reported in the month of August of this year in the *Boston Medical and Surgical Journal*.

Dr. Arthur Dean Bevan was not willing to accept the diagnosis of left-sided subphrenic abscess in the absence of post-mortem evidence. Surely, in view of the great rarity of left-sided subphrenic abscess from an appendix lesion, and in the absence of a post-mortem examination, this case could not be admitted into the literature with the diagnosis proposed. Every one who had operated on subphrenic abscesses by the transthoracic route knew how limited was the view of the surrounding organs, obtained at the time of operation, and how difficult it was to determine the extent and source of the lesion. There were so many possibilities in the case that had not been excluded, and could not be excluded, without a post-mortem, that the diagnosis proposed was not warranted. Some of these he would mention: First, that the pus found was the widely distributed pus of a general peritonitis; second, it was but one of the evidences of a pyæmia; third, it was secondary to an infection of the spleen; fourth, it was secondary to an infection of the left pleura or lung, etc. He had no desire to be hypercritical, but was unwilling to accept the diagnosis, which he thought was based on insufficient data.

Dr. Eisendrath stated that there was no question at all about appendicitis in this case, and he thought Dr. Greensfelder would bear him out in that statement, as he operated on the case twice, and there was positive evidence of appendicitis.

Dr. Greensfelder said the patient was admitted to the hospital in a septic condition; he was suffering from general septic peritonitis, so that operation was deferred. It was not deemed advisable to operate. Patient was placed in bed on supporting treatment; no food was given per mouth, but patient was fed by the rectum for two or three days. The symptoms increased in severity; the temperature rose, and pulse became very much accelerated. At the first operation a simple incision was made, and pus evacuated. The patient went into collapse after the first operation, and was transfused with normal salt solution for days.

At the expiration of a week the symptoms had not abated. The temperature was high. For the first twenty-four hours it was 106-7° F.; pulse, 130 to 140. At the second operation the appendix was found gangrenous, its tip being separated from the appendix itself for a distance of half an inch. A Mikulicz drain was introduced, and at this time the case came under the care of Dr. Eisendrath.

DR. EISENDRATH called attention to the fact that there was absolutely no rule that a subphrenic abscess following an appendicitis must necessarily be on the right side. The speaker quoted from an article in the ANNALS OF SURGERY in support of his contention. He could not see how the anatomical distribution had anything to do with it. The micro-organisms could easily gain access to any portion, become encapsulated, and the process be latent, to be rekindled at some later period. He said there was not the slightest doubt that this abscess was secondary to the appendicitis, and of its being a portion of a generalized suppurative peritonitis located at this particular place.

REVIEWS OF BOOKS.

A Text-Book of Pathology and Pathological Anatomy. By Dr. Hans Schmaus. Translated from the sixth German Edition, by A. E. Thayer, M.D. Edited by James Ewing, M.D. Philadelphia and New York: Lea Brothers & Co., 1092.

This work has enjoyed a high degree of popularity as a text-book among the students of medicine in Germany. It fills a peculiar position of its own. Most of the other German works on pathology are works of reference rather than text-books. In this book there is a more compact, but fully comprehensive, presentation of the subject. There is an absence of author's theories and arguments, quotations and references, which are a feature of other works. This book presents a statement of the subject in concise language, based upon the most recent views and knowledge of the author. The illustrations are excellent.

The book opens with an introductory chapter in which the general subject of deviations from the normal anatomy and physiology is discussed. This chapter contains a description of the signs of death as applied to the whole organism.

The book is thus divided into two parts. Part I treats of general pathology, and Part II, of special pathology. Under the disorders of circulation are described hyperæmia, anæmia, hæmorrhage, œdema, thrombosis, embolism, and metastasis. The chapter on Regressive Processes includes necrosis, atrophy, and the various degenerative changes. Progressive Processes include all of the reparative processes: hypertrophy, inflammations, infectious granulomata, and tumors. Congenital anomalies and deformities and parasites are also treated under Part I. A final chapter in this part is devoted to general diseases from disturbed

general functions, such as cardiac insufficiency, asphyxia, fever, intoxications, and autointoxications.

The part devoted to special diseases takes up systematically the circulatory apparatus; the spleen, lymphatics, and marrow; the respiratory organs; digestive organs; urinary system; nervous system; organs of locomotion; genital organs, and the skin.

This whole arrangement of subjects is an unusual one in text-books on pathology. It makes the book a most valuable adjunct to works on practice of medicine, surgery, and diseases of the special structures. Thus the chapter on the disorders of the circulation needs only to have added the diagnostic signs and treatment to make it a complete chapter on that subject ready for introduction into a text-book on the practice of medicine. This is because the author deals not only with the pathological anatomy, but also with the functional pathology as well,—a feature which makes this work of especial value to the student, who must associate the disorders of structure with those of function.

A particularly valuable chapter is that on regressive processes, giving clear and concise descriptions of the various cell degenerative changes.

The progressive processes are well presented. This chapter deals with the tendency of cells to produce others of their kind, and the stimuli which govern this tendency. During the stage of development there exists the power of cell reproduction to advance to the point of full normal growth. When this has been reached, multiplication of cells ceases, but still the power to replace lost tissue remains. This is the process of repair, and is closely connected with physiological growth. Another progressive process is that of hypertrophy, due in some cases to increased functional activity of an organ, or to unknown internal stimuli. The views of Hansemann are reflected in the author's discussion on metaplasia. He also makes use of Hansemann's term, anaplasia.

The subject of regeneration and repair is presented in a manner that makes this work a valuable adjunct to surgical study.

The process of wound healing is treated in the light of the new knowledge. This is particularly true of inflammation. The author adopts an anatomical description of inflammation rather than a clinical one. The *rubor, tumor, calor,* and *dolor* of Galen are of value clinically, but in the cadaver only the redness and swelling remain. It is, therefore, difficult to dissect an inflammation. The author treats it as a local defect in the circulatory apparatus. It is finally described as a condition of reaction, "exalted above the physiologically normal, pathologically altered, and called forth by an external irritation."

The descriptions of tumors in general are brief,—too brief to give an adequate picture. This is not altogether the case with the more important neoplasmata, carcinoma, and sarcoma, for here the descriptions are fuller; and the value of the work to the student is increased by an abundant clinical description of each variety of malignant growth. We wish particularly to compliment the very excellent work of the artist Krapf in his illustration of glioma.

"The etiology of tumors," the author says, "is one of the darkest points in pathology, for the hypothesis of anaplasia does not explain why in a given case the altered cells develop into a tumor." The author follows the confusing classification of putting endothelium with epithelium, one a mucosa derivative and the other a connective-tissue derivative. Still, he speaks of the epithelium of blood and lymph vessels. The chapter on tumors ends with an appendix giving the differential diagnosis between sarcoma and carcinoma.

The bacteria are given but scant attention. Only a few forms are described; and the general principles of bacteriology are but slightly touched upon.

The chapter on diseases of the blood is good. The pathology of the lungs and of the kidneys is admirably presented; and, indeed, these two subjects show this work to its best advantage. Here the student secures an insight into the pathology of the

structure, and also of the function of these organs, such as few text-books offer.

The description of the diseases of the urinary system, besides giving the pathological anatomy of the various lesions, presents also a great deal of clinical pathology; that is, the lesions are described in such a manner that their anatomy leads up to their symptomatology.

Diseases of bone, diseases of the female genital organs, and diseases of the skin are all well and fully treated.

It is noteworthy that this work goes into the pathology of hernia and intestinal obstructions, subjects which may very properly be considered in text-books of pathology, but which usually have been neglected.

The day is not yet, but will be, when it shall not be necessary for us to have our text-books on pathological anatomy translated out of the German. In this instance the translators have done us a service.

JAMES P. WARBASSE.

DISEASES OF THE SKIN. By JOSEPH GRINDON, PH.B., M.D. Philadelphia and New York: Lea Brothers & Co.

This volume of three hundred and seventy-seven pages is one of the series of Lea's pocket text-books under the general editorship of Bern B. Gallaudet, M.D.

As a rule, small works upon any special subject are unsatisfactory, for it is almost impossible for the author to do justice to the subject; the book under review is an agreeable exception to the rule.

Dr. Grindon has very skilfully succeeded in making it in truth a text-book which cannot fail to be of benefit to both students and general practitioners.

Any scheme of classification is very wisely omitted; discussion of class is out of place in a book of this sort.

The introduction is a short but comprehensive chapter on

symptomatology; next come a few pages on etiology, followed by three on diagnosis; these last are by far the most valuable in the book, for in a most concise manner all the methods used to make a diagnosis are noted, and many minor points are emphasized that often receive but slight notice in more pretentious works on dermatology.

The author has imbued the work with his personality; it fairly bristles with characteristic remarks, as, for instance, in speaking of rosacea he says, "Alcohol is not the only cause,—of which fact any one having faith in his fellow-man may convince himself by watching the parade of a total abstinence society."

As a rule, the commoner diseases are given the greatest prominence, twenty-four pages being given to eczema; this was undoubtedly done for the benefit of the general practitioner.

The author has not failed to notice all the recent advances in dermatology, even devoting a part of a page to Johnston's paratuberculosis.

The book is liberally illustrated; the pictures are poor, excepting those of syphilis; those for black and whites are unusually fine.

Taking the book as a whole, it stands far ahead of any of the smaller works on dermatology, and the reviewer joins the author's other dermatological confréres in the hope that this is only a synopsis of a larger and more complete text-book.

JAMES M. WINFIELD.

THE DISEASES OF INFANCY AND CHILDHOOD. By L. EMMETT HOLT, M.D., LL.D., Professor of Diseases of Children in the College of Physicians and Surgeons (Columbia University), New York. Second Edition, Revised and Enlarged. 8vo; 1163 pages. New York: D. Appleton and Company, 1902.

This book is the work of a teacher and one trained in hospital wards. It aims to cover the entire field of pædiatrics, but more especially the diseases of infancy and young childhood.

More space than usual has been given to the pathology and description of lesions.

Divided into two parts, the first treats of the hygiene and general care of infants and young children, the growth and development of the body, and the peculiarities of disease in children. The methods of investigation and the differential points of diagnosis are treated entirely from a practical stand-point. In the domain of therapy the author lays down two fundamental principles; first, never to give a dose of medicine without a clear and definite indication, and, second, never to give a nauseous dose when one that is palatable will answer the purpose equally well. Hygiene, surroundings of the patient, the value of good nursing, careful feeding, and judicious stimulation are the key-notes of his treatment. In this field, as in the administration of medicines, most of the recent methods are discussed.

Part II is divided into ten sections: first, the diseases of the newly born; second, those of nutrition, and, lastly, the diseases of the various systems of the body are discussed. A special section is given to the specific infectious diseases. The chapter on diphtheria is especially exhaustive. Nutrition in its broadest sense is considered to be the most important branch of pædiatrics, and the author, believing this, has devoted over one hundred pages to the study of this question. In this chapter the food constituents and the purposes they subserve in nutrition are first taken up. Then the infant's dietary, infant feeding, feeding after the first year, the derangements of nutrition, and, finally, diseases due to faulty nutrition are considered.

The book presents the most advanced teachings on the subject of pædiatrics.

PAUL MONROE PILCHER.